REPUBLIC OF THE SUDAN

REPORT

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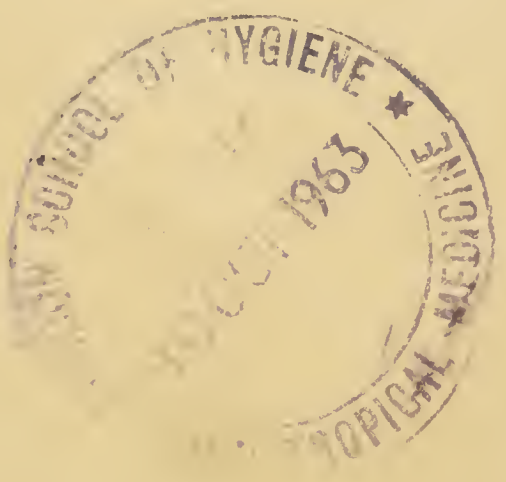

MEDICAL SERVICES, MINISTRY OF HEALTH

FOR THE YEAR

1960/61

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REPORT

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Chapter I

INTRODUCTION

Rainfall was late and below the average in most parts of the country. This resulted in water, fodder and grain shortage and death of some sheep and cattle in the affected areas. Some villages were deserted. The rain shortage had its adverse effect on cotton as well.

There were fewer places for mosquito breeding and consequently fewer cases of malaria.

Events of great importance during the year were the opening of the new main canal to irrigate the Managil Extension and the start of building of two dams—Damazin (on the Blue Nile) and Khashm El Girba (on the Atbara River). The irrigated area under cultivation in the Gezira will increase by 800,000 feddans (4/5 of the present cultivated area). The Damazin and Khashm El Girba Dams will irrigate 1,000,000 and 500,000 feddans respectively. At present care is being taken to control Bilharzia, Malaria, Kala-Azar and other endemic diseases in the newly irrigated areas.

On the epidemic disease side, measles, chicken-pox, mumps and whooping cough had their usual incidence and course.

Two mild and localised outbreaks of small-pox in the Southern Division of the Blue Nile and Northern Provinces were brought to an end within a few weeks of their appearance.

Cerebro-Spinal-Meningitis invaded the Provinces of Darfur, Kordofan, Khartoum, Blue Nile, Kassala and Upper Nile during the course of the year with its heaviest incidence in the first three Provinces during the months of May and June.

A localised and small outbreak of relapsing fever was controlled within a few weeks at Port Sudan Area.

On the endemic disease side, malaria is on the decrease especially in the W.H.O. assisted area, and where anti-tarval and residual spray are in use.

Namru-3 of the U.S. Navy Research Unit at Malakal is undertaking research work to fill in the existing gaps in our knowledge about the epidemiology of Kala-Azar. They are particularly aiming at establishing the vector insect, the animal reservoir, better methods of diagnosis, less toxic and more effective methods of treatment and finally the relationship between the state of nutrition, diet and Kala-Azar in the hyper-endemic areas.

A sharp rise in the incidence of typhoid fever occurred in Khartoum and the Blue Nile Provinces.

In Bahr-el-Ghazal Province the survey to assess the magnitude of the Onchocerciasis problem is still going on.

In the Gezira Irrigated Area research is being carried out to control the bilharzia snail vectors with chemical and mechanical barriers.

Trypanosomiasis in Equatoria is being kept down with Iomidine prophylaxis.

With the help of the W.H.O. Diarrhoeal Advisory Team, the Ministry of Health is making a co-operative study in both urban rural areas of Khartoum Province. The sample surveys will continue for a year.

In the curative side of disease, five hospitals, eleven dispensaries and fifty-five dressing-stations were opened during the course of the year.

W.H.O. Assisted Projects

B.C.G. Campaign : The W.H.O. Adviser assigned to the B.C.G. Campaign as an International counterpart was withdrawn in accordance with the agreement. Further International assistance ceased. Consequently the Sudan Government assumed full responsibility of the project.

Permanent B.C.G. Centres are now established in most of the provincial hospitals. Centres are operating in Wad Medani Tuberculosis Demonstration and Training Centre, Khartoum Chest Hospital, El Obeid, Kassala, Atbara and Port Sudan Hospitals.

During the course of the year 91,009 tests and 39.391 vaccinations were performed.

T.B. Pilot Project : The Tuberculosis Control. Demonstration and Training Centre at Wad Medani is now running on its planned and organized system. Apart from the routine clinical work and demonstration, there are also external activities such as home visits, organized group examination and case - finding programme. 22,504 cases passed through the clinic during the year. 15,276 persons were tested, of whom 4,558 were vaccinated. 2,476 home visits were made.

Nursing College : 29 girl students were under training during the course of the year in the three classes (Junior, Intermediate and Final) of the College.

At the request of the W.H.O. 3 alien girl students from Libya and Somalia were admitted to the Nursing College. They are having special courses in nursing.

One girl student graduated during the year.

Malaria Pilot Project : The project at Sennar has now completed its 4th year. It protected a population of nearly 600,000 persons over an area of approximately 78,044 square kilometres.

General spraying and special campaigns for the nomads and migrant labourers were performed with D.D.T.

The management of the project is now under national hands. The W.H.O. Team which still works in a part-time advisory capacity has transferred its headquarters to Khartoum to start the Malaria pre-eradication survey which has so far covered Khartoum and Kassala Provinces.

Onchocerciasis Control Pilot Project : It has been decided to start next year in Bahr-el-Ghazal in Wau Area, a limited pilot project assisted by the World Health Organization. The aim will be testing the extent of success of administrative, curative and preventive methods before embarking on a large scale mass campaign. If this pilot scheme proves successful the project will gradually be expanded to cover the whole infected area. The Pilot Project is originally planned to continue for a period of three consecutive years.

Blood Bank : The Central Transfusion Laboratory, established in Khartoum Hospital, was opened during the year. H.E. The President kindly donated part

of his own blood to the Blood Bank. Further equipment was provided by the World Health Organization.

The W.H.O. Expert left the country by the end of December, 1960 and the management of the Blood Bank was transferred to national hands.

School of Dental Assistants (W.H.O. Project Sudan 17)

The School of Dental Assistants started in October, 1960. The building is situated near Omdurman Hospital and was formerly Hostel No. 2 for the medical assistant students. The class started with 12 male students and in June, 1961 a girl student from the Army Medical Corps joined the class.

The School was provided with dental equipment and supplies as a donation from the World Health Organization. The teaching was the responsibility of the staff of the Ministry until Dr. Y. Zaki the W.H.O. Dental Health Adviser arrived in January 24th 1961 and took over the responsibility of the teaching and administration.

U.N.I.C.E.F.

This Organization is extending appreciable help to mother and child welfare centres, midwifery, nursing schools (junior), tuberculosis and malaria projects.

Milk, vitamin and mineral tablets, equipment and transport are being supplied to 39 centres.

Fellowships

The following candidates were awarded study courses during the year :

Name	Nature of Study	Country
Sit Limindamat Geili Bakheit ...	Midwifery	U.K. and Middle East
Dr. Ali Daw El Beit	D.P.H. Course	U.K.
Dr. Mohd. Osman Hassan Giritly	,, ,, ...	,,
Dr. Abbas Mukhtar Ali Salim ...	,, ,, ...	,,
Dr. Hassan Mohd. Ibrahim ...	Diploma of Anaesthesia	,,
Dr. Ibrahim Khalil Bayoumi ...	,, ,, ...	,,
Sayed Yacoub Abbasher ...	Health Aspects of Community ...	U.A.R.
Sayed Hassan Fartak	Development in Arab States ...	,,
Sayed Ghorashi Ahmed Ghani ...	Training Education Centre ...	,,
Sayed Abbas Abdel Hadi ...	at Saras-El-Layyan- -	
Sitt Safia Mohd. Ali	Monofia U.A.R.	
Sitt Aeisha Suleiman	(for 3 months)	
Dr. Zaki El Din Ahmed	Surgery	U.K.
Dr. Dawod Ahmed Idris ...	,, ...	,,
Dr. Abdel Ghaffar A/Rahim ...	Medicine	,,
Dr. Abdel Bari Mitwakil	,, ...	,,
Sayed Sabah El Kheir	Health Aspects of Community	
Sayed Abdel Fattah Abdel Magid	Development in Arab States Train-	U.A.R.
Sayed Awad Ahmed Sedik ...	ing Education Centre at Saras-El-	
Sayed Abdel Gadir Ahmed ...	Layyan- -Monofia, U.A.R. for 3	
Sitt El Toma Ahmed	months)	
Sitt Khadra Saad		
Sayed Abdel Rahman Abu Elgasim	Junior course on Malaria Eradica-	
Sayed Hassan Babikir Eisa ...	tion (for 3 months at Cairo) ...	U.A.R.
Dr. Awad Mohd. Ahmed ...	Obstetric and Gynaecology ...	U.K.
Miss Kaltoum Agab Ali	Hygiene and Public Health at the All-India Institute of Hygiene and Public Health at Calcutta ...	India

Some 58 visitors from W.H.O. and various other countries visited the Sudan either in connection with the above-mentioned projects or on fellowship study tours.

Delegates from the Ministry of Health have attended the following Conferences or Seminars :

Name	Conference	Date
Dr. Taha Ahmed Baasher ...	13th Meeting of the World Federation for Mental Health at London	24th—29th July, 1960
	— and —	
	13th Annual Meeting for Mental Health at Edinburgh	8th—13th August, 1960
Dr. Ahmed Ali Zaki	10th Session of the Regional Sub-Committee 'A' of the Eastern Mediteranean at Tunisia ...	15th -19th August, 1960
Dr. A.O. Abu Shamma	W.H.O. Executive Board at Geneva	25th Oct.— 15th Nov., 1969
Miss Awatif Osman ... ... Miss Batoul Saad ... ... Sitt Hawa Mohd. Salih	Nursing Regional Seminar at Lahore, Pakistan	17th, Nov., 1960
Dr. Taha Ahmed Baasher ... Dr. Ibrahim Ahmed Hussein ...	Inter-Regional Conference on the Epidemiology of Mental Disorders in Italy and Regional Mental Health Experts of World Health Organization in Alexandria	6th—15th December, 1960 19th—23rd December, 1969
Dr. A.O. Abu Shamma	W.H.O. Executive Board at New Delhi (India)	28th, Jan., 1961
Dr. A.O. Abu Shamma ... ... Dr. Khalil Abdel Rahman ... Sayed El Tahir Mustafa	14th. World Health Assembly at New Delhi (India)	7th—25th Feb., 1961
Dr. Mohd. Hamad Satti ... ... Sayed Mohd. Mahmoud El Melik	Seminar on Problems of Public Health in Berlin	9th March—17th April, 1961
Dr. Hadi El Nagar	29th Session of the Arab Medical Conference in Cairo	24th—28th May, 1961
Dr. A.O. Abu Shamma	28th Session of W.H.O. Executive Board at Geneva	29th May, 1961
Sayed Khalafalla Babikir El Bedri Dr. Ahmed Ayoub El Gaddal ...	Provincial Malaria Eradication Inter-Country Board of Ethiopia and the Sudan at Addis-Ababa, Ethiopia	29th May—3rd June, 1961
Dr. Mansour Ali Haseeb ... Dr. Mohd. Hamad Satti ... ... Dr. Mohd. Shereif Dawod ...	Onchocerciasis Conference at Brazzaville	12th—18th June, 1961

CHAPTER II

ADMINISTRATION

(A) STAFF AND FUNCTIONS

Table I shows the establishment of classified staff. Some categories of the professional and technical staff were still under establishment. The Table includes officials serving on secondment with Local Government Authorities.

PERSONNEL

TABLE I

Statistics of Classified Staff Establishment covering the period 1.7.1960 to 30.6.1961 :—

CATEGORY	Establishment	
	Sudanese	Expatriate
HEADQUARTERS		
Director	1	—
Deputy Director	1	—
Asst. Director (Public Health) and Curator of the Graphic Museum	1	—
Asst. Director (Hospitals)	1	—
Chief Tuberculosis Division	1	—
Deputy A. Director (Hospitals)	1	—
Chief Public Health Inspector	1	—
Senior Establishments Officer	1	—
Inspector of Administration	1	—
Establishment Officer	1	—
Principal School of Hygiene	1	—
Principal Matron	1	—
Asst. Principal Matron	1	—
Head Staff Clerk	1	—
Secretary to Minister of Health	1	—
Staff Clerk	4	—
Senior Clerk	10	—
Clerk (Including T.B.T. Centre)	18	—
Clerk (Statistics)	1	—
Junior Clerk (including Minister of Health Officer)	8	—
FINANCE BRANCH		
Controller of Accounts	1	—
Inspector of Accounts	1	—
Head Accountant	1	—
Accountant	4	—
Senior Book-keeper	4	—
Book-keeper	19	—
Junior Book-keeper	3	—
STORES SECTION		
Chief Medical Supplies	1	—
Controller, Medical Stores	1	—
Asst. Controller, Medical Stores	1	—
Supt. of Stores	2	—
Stock Verifier	1	—
Senior Store-keeper	3	—
Store-keeper	18	—
Store-keeper Under Training (Northern Hospitals)	10	—
Junior Store-keeper	8	—
Telephone Operator	1	—
	135	—

Category	Establishment	
	Sudanese	Expatriate
Hospitals and Dispensaries		
Senior Physician and Director, Khartoum Hospital	1	—
Senior Surgeon	1	—
Senior Obstet. and Gynaecologist	1	—
Senior Ophthalmologist	1	—
Senior Psychiatrist	1	—
Physician	9	—
Chest Physician	3	—
Surgeon	5	5
Ear, Nose and Throat Surgeon	—	1
Psychiatrist	1	—
Radiologist	3	—
Anaesthetist	2	—
Registrar in Anaesthesia	2	—
Gynaecologist	9	—
Opthalmologist	8	1
Registrar	3	—
General Duty Doctor (including Study Courses)	129	27
Houseman	53	—
Senior Dental Surgeon	1	—
Dental Surgeon	4	3
Dental Officer	2	2
Dental Mechanic	2	2
Dental Mechanic Trainee	1	—
Pharmaceutical Registrar	1	—
Pharmacist	2	—
Lay Administrator	1	—
Supt. Radiography	1	—
Clinical Pathologist	1	—
Senior Dispenser	5	—
Dispenser	21	—
Dispenser under Training	6	—
Senior Radiographer	2	—
Radiographer	30	—
Asst. Radiographer U.T.	18	—
X-Ray Technician	1	—
Hospital Manager	5	—
Dark Room Technician	1	—
Electrical Engineer	—	1
Laboratory Technician	—	3
Senior Medical Assistant	15	—
Medical Assistant	521	—
Mental Health Assistant	2	—
Ophthalmic Assistant	7	—
Refractionist	7	—
Refractionist Trainee	10	—
Senior Nursing Instructor	2	—
Nursing Instructor	33	—
Theatre Attendant	72	—
Head Mumarrid	58	—
Senior Clerk	9	—
Clerk	30	—
Junior Clerk	15	—
Card Clerk	2	—
Senior Book-keeper	14	—
Book-keeper	23	—
Junior Book-keeper	38	—
Senior Store-keeper	2	—
Store-keeper	19	—
Junior Store-keeper	51	—
Store-keeper Under Training	7	—
Telephone Operator	6	—
Quarantine Overseer	2	—

Category	Establishment	
	Sudanese	Expatriate
Nursing Staff		
Matron, Khartoum Hospital	-	1
Matron, Omdurman Hospital and N.T. School ...		1
Hospital Matron (W/Medani, Port Sudan, Fasher., Juba El Obeid and Atbara)	4	2
Asst. Matron, Charge Sister	2	1
Charge Sister	7	8
Physiotherapist		2
Nursing Sister	19	
Nursing Sister (Expatriate)		23
School Hostess (Nursing College)	1	—
A/Nursing Sister (Sudanese)	29	—
Dietician Sister	-	1
Theatre Sister	—	1
Sister Tutor	-	2
Ward Sister	-	17
Nurse U.T. Abroad	2	-
Staff Midwife	6	—
Total	1,352	104
Public Health		
Province Medical Officer of Health	11	-
Asst. Province Medical Officer of Health	9	-
Woman Doctor	1	—
Senior Public Health Inspector	11	-
Public Health Inspector	12	-
Port Health Officer	1	-
Public Health Officer	65	-
Principal, Midwifery T. School	-	1
Principal, Health Visitors T. School	1	-
Asst. P., Health Visitors T. School	1	-
Asst. P., Midwiferies T. School	1	-
Health Visitor	19	—
Senior Staff Midwife	6	-
Staff Midwife	16	-
Asst. Supt. Nursing Officer	2	—
Senior Health Visitor	6	-
Supt., M.T. School	6	-
Supt., Nursing Officer	8	4
Senior Sanitary Overseer	1	-
Sanitary Overseer	160	—
Public Health Student Under Training	12	-
Senior Technical Clerk	1	-
Senior Clerk	2	-
Clerk	4	-
Junior Clerk	12	-
Junior Book-keeper	1	-
Staff Clerk	1	-
Total	370	5

Category	Establishment	
	Sudanese	Expatriate
Research and Laboratories		
(*a*) *Stack Medical Research* :		
Asst. Director, Research	1	—
Bacteriologist	1	—
Medical Zoologist	1	—
Pathologist	1	—
Registrar	1	—
Supt., Laboratory	1	—
Laboratory Technician	13	—
Laboratory Technician Trainee	4	—
Senior Laboratory Assistant	14	—
Laboratory Assistant	78	—
Head Laboratory Attendant	2	—
Junior Technical Assistant	1	—
Senior Clerk	1	—
Clerk	1	—
Junior Clerk	1	—
(*b*) *Chemical Laboratories* (*W.C.L.*)		
Government Analyst	1	—
Asst. Government Analyst	3	—
Scientific Officer Under Training	2	—
Senior Technical Assistant	2	—
Technical Assistant	5	—
Junior Technical Assistant	3	—
Clerk	1	—
Library Clerk	1	—
(*c*) *Medical Entomology* :		
Medical Entomologist	—	1
Asst. Scientific Officer Under Training	1	—
Entomological Technician	1	—
Technical Assistant	1	—
Junior Technical Assistant	2	—
Junior Clerk	1	—
(*d*) *Schistosomiasis* :		
Biologist	—	1
Senior Technical Assistant	1	—
Technical Assistant	1	—
Clerk	1	—
Store-keeper	1	—
Total	149	2
Graphic Museum		
Asst. Curator	1	—
Technical Assistant	1	—
Museum Attandant	1	—
Total	3	—

SUMMARY OF CLASSIFIED STAFF

Section	Establishment	
	Sudanese	Expatriate
Headquarters	135	- -
Hospitals and Dispensaries	1,352	104
Public Health	379	5
Stack Medical Research	121	- -
Chemical Analytical Section	18	- -
Medical Entomology	6	1
Schistosomiasis	4	1
Graphic Museum	3	-
Grand Total	2,069	111

Unclassified Staff excluding casual labour numbered 8,169 approximately.

PHYSICIANS ETC. PRACTISING IN THE SUDAN

Occupations	Government Officials Serving in Min. of Health	Private Practice
Physician (including Chest Physician)	13	100
Surgeon	12	- -
Obstet. and Gynaecologist	10	- -
Opthalmologist	10	-
Psychiatrist	2	- -
Radiologist	1	- -
Anaesthetist	4	-
General Duty Doctor	2 9	- -
Dentist	12	25
Pharmacist	3	55
Dispenser	26	- -
Medical Assistant	536	- -

(B) LEGISLATION

The following legislation was enacted during the year :—

THE EMPLOYMENT OF CHILDREN (WORKSHOPS) (AMENDMENT) REGULATIONS, 1960

(1960 L.R.O. No. 32)

In exercise of the powers conferred on it by Section 13 of the Employment of Children Ordinance, the Central Board of Public Health with the approval of

the Minister of Health hereby makes the following amendment to the Employmen of Children (Workshops) Regulations. namely :—

In Regulation 2 (ii) and after (h) the following is added :—

"(i) Match filling and packeting."

(C) FINANCE

Table II (A)

Income and Expenditure of the Ministry of Health over the last 4 years

	1957/58	1958/59	1959/60	1960/61
	LS.	LS.	LS.	LS.
Revenue	64,061	82,586	82,137	87,990
Expenditure				
Personnel	1,926,034	2,036,236	2,134,965	2,599,970
Services	1,753,318	1,785,949	1,849,213	2,047,052
Extra-ordinary	20,173	22,478	31,800	41,618
Total ...	3,699,525	3,844,663	4,015,978	4,688,640

Table II (B)

Analysis of Expenditure of the Ministry of Health for 1960/61

Section	Personnel	Services	Extra-Ordinary	Total
	LS.	LS.	LS.	LS.
Headquarters	108,182	514,397	51,528	674,107
Hospitals	1,947,670	1,381,459	—	3,329,129
Hygiene and Public Health ...	253,297	329,360	—	582,657
Research	81,487	18,753	—	100,240
Graphic Museum	2,507	—	—	2,507
Seconded Staff	—	—	—	—
Total ...	2,393,143	2,243,969	51,528	4,688,640

Remarks :—

1960/61 figures are based on actual expenditure up to 31.5.1961 plus estimated expenditure to end of June, 1961.

Chapter III

PUBLIC HEALTH

(A) HEALTH OF OFFICIALS

Table III

Nationality	No. of Officials Employed	No. Placed on Sick List	No. of Days Sick	Average Days Sickness	
				For all Officials	For those who were Sick
Sudanese	16,502	5,285	23,629	1.43	4.47
Non-Sudanese ...	410	70	625	1.52	8.93

(B) GENERAL HEALTH

EXPANSION OF HOSPITAL SERVICES

The following were opened for work during the year :—

	No. of Beds
Bentiu Hospital	100
Daein Hospital	60
Sinkat Hospital	60

The building of the following 60 bedded hospitals was completed during the year. They will operate soon :—

El Geteina Hospital.
Delgo Hospital.
El Borgeig Hospital.
Abu Hamad Hospital.
Buram Hospital.

The following hospitals are still under construction :—

Zeidab Hospital.
Hawata Hospital.
Hassaheissa Hospital.
Kuttum Hospital.
Yirrol Hospital.

Four of the above hospitals will accommodate 60 beds each. Kuttum will be a 100 bedded hospital.

Other buildings that were approved for the year appear in the following list :—

Province	Locality	Buildings Erected
Bahr-El Ghazal	Wau	2 T.B. wards—24 beds each.
	Rumbek	2 T.B. wards—24 beds each.
	Aweil	3 houses for hospital staff.
Blue Nile	Singa	T.B. ward 24 beds.
	Kosti	Office for Public Health Officer
	Rufaa	House for Public Health Officer
	Kurmuk	House for Public Health Officer.

Province	Locality	Buildings Erected
Darfur	Geneina	Administration Block and Theatre.
	Nyala	Female ward—8 beds.
	Nyala	Male ward—8 beds.
	El Daein	Office for Public Health Officer.
	El Daein	House for Public Health Officer.
	Geneina	House for Medical Officer.
Equatoria	Loka	House for Medical Assistant.
	Trekaka	House for Medical Assistant.
	Mongala	House for Public Health Officer.
	Torit	House for Public Health Officer.
Kassala	Kassala	Extension to Midwifery School
	El Hawata	Office for Public Health Officer.
	El Hawata	House for Public Health Officer.
Khartoum	Khartoum	Mess for Doctors.
	Khartoum	Dormitory for the School of Hygiene.
	,, North	New Out-patient Dept.
	,, ,,	Conversion of existing offices into 40 bedded ward.
	,, ,,	Extension to Clinic for Nervous Disorders.
	Omdurman	Theatre Block for Eye Department.
	,,	Eye ward—40 beds.
Kordofan	El Obeid	Conversion of existing store into T.B. ward -24 beds.
	Kadugli	2nd. class- -8 bedded male ward.
	,,	2nd. class 6 bedded female ward.
Upper Nile	Bor	Two T.B. wards- -24 beds each.
	Kodok	Office for Public Health Officer.
	,,	House for Public Health Officer.
	Bor	2 houses for Hospital Officials.

The programme of expansion of Dispensary services included the following additions :—

Province	New Dispensaries	New Dressing Stations
Bahr El Ghazal	- -	2
Blue Nile	5	15
Darfur	3	5
Equatoria	1	3
Kassala	- -	8
Khartoum	- -	4
Kordofan	1	6
Northern	1	11
Upper Nile	- -	1
Total ...	11	55

TABLE IV

Work Done in Hospitals and Dispensaries for Last 10 Years

Year	Admissions	Attendances	Operations
1951/52	168,251	12,181,931	26,021
1952/53	164,331	13,966,390	26,114
1953/54	172,675	14,483,366	34,432
1954/55	171,092	16,453,892	38,285
1955/56	154,093	17,694,550	38,287
1956/57	176,716	20,430,070	53,839
1957/58	175,543	21,410,339	50,023
1958/59	216,538	24,730,041	64,556
1959/60	185,601	23,999,256	86,771
1960/61	190,962	29,932,923	88,992

There were 100 licenced private practitioners working independently during the year under review. The figures of their work do not appear in the above list.

ACTIVITIES OF SPECIAL DEPARTMENTS IN HOSPITALS

Dental Clinics : Work done by these Departments in all provinces during the year is as follows :—

Number of Attendances	100,580
Extractions	64,776
Conservations	6,149
Scaling and Gum Treatment	14,762
Minor Oral Surgical Cases	2,632

X-Ray Department — Khartoum : Number of X-Ray Films taken for out-patients and in-patients during the year was 22,649.

Physiotherapy Department— Khartoum : Number of attendances during the year was 32,129.

Total number of patients was 3,710 of whom 294 were ward-patients. Details of the treatment given are shown below.

	Number of Treatments
Radiant Heat	5,103
Massage	4,054
Exercises	12,382
Faradism Galvanism	2,418
Traction of Spine	129
Splinting	128
Dennis Brown Splinting	7
Breathing Exercises	246
Short Wave Diathermy	6,493
Ultra Violet Therapy	1,169
TOTAL	32,129

(C) VITAL STATISTICS

Below is the estimated population of the Sudan rendered by the Department of Statistics as on 30th June, 1961.

TABLE V

Approximate Estimation of Population by Provinces

Province	Men	Women	Children	Total
Bahr El Ghazal	346,000	349,000	523,000	1,218,000
Blue Nile	657,000	661,000	1,115,000	2,433,000
Darfur	402,000	497,000	638,000	1,537,000
Equatoria	297,000	332,000	419,000	1,048,000
Kassala	389,000	305,000	448,000	1,142,000
Khartoum	186,000	156,000	255,000	597,000
Kordofan	581,000	620,000	873,000	2,074,000
Northern	232,000	297,000	483,000	1,012,000
Upper Nile	309,000	302,000	437,000	1,048,000
TOTAL ...	3,399,000	3,519,000	5,191,000	12,109,000

TABLE VI

Estimated Population of Towns of Khartoum, Khartoum North and Omdurman

Town	Number of Persons			
	Men	Women	Children	Total
Khartoum	43,680	27,430	39,873	110,983
Khartoum North and Rural Areas	100,084	89,217	163,934	353,235
Omdurman	42,183	39,359	51,240	132,782

TABLE VII

Crude Birth Rate: Khartoum, Khartoum North and Omdurman

Town	Number of Registered Births	Crude Birth Rate per 1,000 Persons
Khartoum	4,604	41.5
Khartoum North and Rural Areas	6,797	19.2
Omdurman	5,092	38.3

The above figures show births attended and registered by licensed midwives. Births attended by unlicensed midwives are not registered. So the above crude birth rate is not complete.

(d) PREVENTIVE MEDICINE

1. Insect Borne Diseases

(i) **Malaria**: This disease is one of the major Public Health problems. Residual adult mosquito control with gammexane spraying is gradually being expanded in all provinces. larval control is being effected in big towns with gardens and Agricultural Schemes.

FOLLOWING TABLES GIVE FIGURES FOR CASES AND CONTROL ACTIVITIES

MALARIA INCIDENCE

Year	Bahr el Ghazal			Blue Nile			Darfur			Equatoria			Kassala			Khartoum			Kordofan			Northern			Upper Nile		
	Cases	Deaths	Mean Rainfall mm	Cases *	Deaths *	Mean Rainfall mm	Cases	Deaths	Mean Rainfall mm	Cases	Deaths	Mean Rainfall mm	Cases	Deaths	Mean Rainfall mm	Cases	Deaths	Mean Rainfall mm	Cases	Deaths	Mean Rainfall mm	Cases	Deaths	Mean Rainfall mm	Cases	Deaths	Mean Rainfall mm
1956/57 ...	15,890	78	1,167	116,925	48	538	59,134	5	716	47,737	137	1,546	57,510	29	304	19,296	3	264	140,698	55	683	16,115	9	70	26,645	29	979
1957/58 ...	14,762	34	877	79,017	69	426	3,689	8	513	50,782	99	1,238	43,842	23	293	13,701	8	235	91,048	49	528	20,422	5	54	24,993	26	793
1958/59 ..	17,025	44	1,016	96,404	45	432	47,990	19	576	86,458	145	1,409	56,914	28	219	21,078	8	167	144,485	51	416	15,923	3	28	30,136	18	741
1959/60 ...	16,916	36	936	74,150	25	462	41,390	23	538	103,667	77	1,298	74,634	37	321	20,257	10	294	189,548	74	544	16,346	3	80	29,226	29	802
1960/61 ...	31,592	35	1,021	77,620	25	353	67,198	16	548	165,966	107	1,248	57,074	17	224	17,631	3	79	160,908	79	515	14,850	4	214	52,472	50	866

* Figures include Gezira Irrigated Area.

SPECIES OF PARASITES IN 6,743 POSITIVE SLIDES

Province	P. Falciparum	P. Vivax	P. Malaria
Bahr El Ghazal	569	12	—
Blue Nile	1,076	174	1
Darfur	452	16	—
Equatoria	1,516	18	13
Kassala	518	63	—
Khartoum	89	26	—
Kordofan	962	217	—
Northern	106	6	—
Upper Nile	719	129	61
Total ...	6,007	661	75

SPRAYING ACTIVITY IN THE WHOLE COUNTRY

Province	Provisional Census	No. of Population Protected	No. of Rooms etc. Sprayed	Amount of Insecticides used L.B.
Bahr El Ghazal ...	1,218,000	34,398	17,475	5,406
Blue Nile	2,433,000	1,980,731	962,935	319,000
Darfur	1,537,000	161,760	111,442	36,606
Equatoria	1,048,000	49,373	44,598	14,100
Kassala	1,142,000	526,811	343,850	102,929
Khartoum	597,000	6,672	1,112	960*
Kordofan	2,074,000	426,083	309,033	54,436
Northern	1,012,000	398,259	272,798	90,484
Upper Nile	1,048,000	112,963	62,004	8,725
Total ...	12,109,000	3,697,050	2,125,247	632,646

* Only Abu Deleig Sprayed this year.

N.B. Owing to scarcity of rains and of mosquito breeding places during the season, spraying was not carried out on a big scale as usual and consequently the number of population protected by spraying was less compared to previous years.

Table VIII

Malaria in Gezira Irrigated Area

Separate figures are reproduced hereunder for the Gezira Irrigated Area which show effects of spraying where accessibility of villages for periodical spraying is available.

Year	No. of Cases Diagnosed as Malaria	Recorded Rainfall
1956/57	1,133	442.0 mm
1957/58	1,054	271.9 mm
1958/59	2,399	439.6 mm
1959/60	3,847	556.1 mm
1960/61	3,631	225.2 mm

The number of rooms sprayed in Gezira Irrigated Area was	282,206
The number of rooms sprayed in Managil Area was	51,826
The number of villages sprayed including Managil Area was	1,247
The total amount of Gammaxane or D.D.T. for spraying—lbs.	82,611
The total population of Gezira Irrigated Area (including Managil)	705,114

The following table shows the incidence of malaria as reported from the 24 dispensaries selected for follow-up since 1950/51 in the Gezira Irrigated Area. It is clear that there is a marked decrease in the incidence.

Dispensary	50/51	51/52	52/53	53/54	54/55	55/56	56/57	57/58	58/59	59/60	60/61
Saadalla ...	1,226	176	175	76	93	45	52	30	37	28	4
Abdel Galil	596	210	188	53	107	68	20	—	—	—	—
Wad Rahma	1,593	195	299	184	318	7	5	2	—	—	—
Tibub ...	1,449	195	199	133	124	2	5	—	9	4	16
Maringan	679	31	65	163	979	310	202	11	2	—	—
Fadasi ...	662	196	245	169	195	114	94	66	97	66	19
Wad El Naiem	461	421	139	201	287	121	—	30	106	1	1
El Kumur	625	48	45	50	664	114	118	69	145	169	191
El Radma	728	131	86	123	69	90	42	18	24	183	263
Mohd. Zein	481	99	110	237	230	46	22	19	57	123	45
Wad Rayia	948	65	104	35	51	85	78	3	57	77	—
El Neweila	1,938	105	55	139	178	77	5	2	31	29	13
El Madina	1,625	231	134	46	56	16	21	2	5	7	11
Mahala ...	1,546	410	364	300	451	107	13	2	—	13	9
Hamad El Nil ...	1,003	132	169	87	135	8	24	—	8	2	—
Wad Magboul	708	166	292	273	254	2	10	15	5	8	—
Remeitab ...	527	136	94	148	234	66	88	3	19	—	48
Wad Noman	727	267	62	70	48	19	—	1	20	—	—
Hag Abdalla	639	179	384	193	154	65	48	5	25	24	11
Um Teribat	800	231	187	81	46	45	5	—	4	51	1
Hosh ...	392	177	174	215	184	93	35	10	29	17	2
Fahal El Shai	256	199	182	257	104	38	141	—	60	22	5
Wad Figda	752	145	484	264	204	3	34	—	—	—	19
El Ogda	1,212	214	133	131	208	73	71	10	2	4	—
Total No. of Cases ...	20,684	4,336	4,351	3,528	4,781	1,614	1,133	298	742	768	538

SUMMARY REPORT ON MALARIA ACTIVITIES DURING 1960/61

During the period covered by this report the Malaria Eradication Pilot Project at Sennar has completed its 4th year of operations in the southern part of Blue Nile Province. A total of over 550,000 population, including nomads and temporary labourers, have been protected by means of residual insecticide spraying with DDT or Dieldrin respectively and by treatment of malaria cases.

Epidemiological surveillance comprising permanent fever cases survey, investigation and treatment of the detected malaria cases and a monthly infant blood survey were expanded and covered 225,000 population.

The malaria incidence has in all zones dropped significantly as compared with the previous year. This was most obvious in the zones under active surveillance ; the latter is to be considered as an essential part of any future anti-malaria programme in the Sudan.

In the Malaria Eradication Pilot Project further successful efforts were made in the field of entomological malaria research, in which the completely reconditioned entomological field station of Wad El Ageili has taken a major part.

On 31.1.1961 the executive management of the Malaria Eradication Pilot Project was transferred to national hands, the W.H.O. team for this project still in part-time advisory function, has been transferred to the Ministry of Health Khartoum, where it has established the offices and laboratories of the Malaria Pre-Eradication Survey, the latter being a joint project of the Government of the Republic of the Sudan and of W.H.O.

Field work of the Malaria Pre-Eradication Survey commenced in February 1961 and has so far covered Khartoum and Kassala Provinces. A general village and nomad survey was established in co-operation with all Public Health authorities in the whole country.

(ii) **Blackwater Fever** : 3 cases were reported this year. Last year 2 cases were recorded.

(iii) **Relapsing Fever** : 22 cases were reported from Port Sudan and Tokar. The disease was apparently imported from the neighbouring country.

A mass delousing campaign was launched throughout the affected areas and police were posted along the border to direct all newcomers from suspected and infected areas to the delousing centre.

IX

Relapsing Fever. Cases and Deaths Over the Last Ten Years

Year	Cases	Deaths
1951/52	12	—
1952/53	97	14
1953/54	91	8
1954/55	3	1
1955/56	1	—
1956/57	4	—
1957/58	2	—
1958/59	—	—
1959/60	6	—
1960/61	22	—

(iv) **Leishmaniasis** : 5,077 cases were reported this year as compared with 4,017 cases last year. Most of the cases, as in the previous year, were reported from the Upper Nile and Blue Nile Provinces. There has been a considerable increase in the number of cases at Gedaref and Kassala Province this year.

Table X

Leishmaniasis : Province Distribution 1960/61

Province	Cases	Deaths
Bahr El Ghazal	—	—
Blue Nile	1,856	56
Darfur	50	—
Equatoria	143	13
Kassala	718	55
Khartoum	143	3
Kordofan	157	14
Northern	5	1
Upper Nile	2,005	48
Total	5,077	190

TABLE XI

Leishmaniasis: Recorded Incidence in the Last Ten Years

YEAR	No. of Cases
1951/52	1,063
1952/53	613
1953/54	895
1954/55	1,106
1955/56	1,889
1956/57	7,463
1957/58	3,939
1958/59	8,414
1959/60	4,017
1960/61	5,077

Extract from Upper Nile and Blue Nile (S.D.) Reports

There was an appreciable decrease in the number of reported and identifie cases since the flare-up of 1958/1959.

The following figures for the last five years confirm the observation :—

YEAR	UPPER NILE		BLUE NILE	
	Cases	Deaths	Cases	Deaths
1956/57	1,977	51	5,008	148
1957/58	724	20	2,432	89
1958/59	3,055	69	4,510	99
1959/60	1,908	29	1,590	61
1960/61	2,005	48	1,856	56

The sudden rise in the incidence of Kala-Azar during 1958-59 in the Upp and Blue Nile Provinces attracted much attention and a special campaign w organised to make a careful survey in the endemic areas of the provinces to sele suitable sites for dispensaries and treatment centres and to gain any possible knov ledge in the hope of finding out any reservoir in animals and if possible to identi the type of sandfly responsible as a vector.

NAMRU-3 WORKING AT MALAKAL

The Kala-Azar United States Naval Medical Research Unit No. 3 began i work in Malakal in the fall of 1959 and their survey team began its studies March, 1960, less than one year after it was decided to establish a Laboratory Stati for research work.

The Main objectives of Namru-3 are :—

1. Find and confirm the vector insects.
2. Find animal reservoir, if any are available.
3. Find better methods of diagnosis and less toxic drugs for treatment.
4. Find if there is any relationship between Kala-Azar and the state of nutrition in the hyper-endemic areas.

(v) *Trypanosomiasis* : New cases detected were 280 with no deaths. In 1959/60 cases recorded were 262 with 5 deaths.

The disease is endemic in the Western Districts of Equatoria Province.

Regular Sleeping Sickness inspections for case finding are being carried out in all endemic areas.

Owing to the rise in the incidence of cases in Yei District, the villagers in the area are having Pentamidine for Chemo-Prophylaxis.

Table 12 shows the distribution of cases for the last 10 years.

TABLE XII

Trypanosomiasis : Distribution of Cases in Equatoria in the Last 10 Years

YEAR	Yubu	Yambio	Yei	Kajo-Kajo	Meridi	Imported	Other Localities	Total
1951/52	—	93	3	—	26	—	—	122
1952/53	2	53	13	—	—	—	—	68
1953/54	12	148	44	—	—	—	—	204
1954/55	—	467	92	—	1	1	—	561
1955/56	2	210	98	—	—	—	—	310
1956/57	18	871	74	2	4	2	—	971
1957/58	34	37	88	—	—	—	—	159
1958/59	8	37	118	—	4	—	2	169
1959/60	24	—	223	—	—	—	15	262
1960/61	19	1	258	—	—	—	2	280

(vi) *Filariasis* : 1 936 cases were microscopically diagnosed during the year out of which 1,818 cases were reported from Equatoria Province.

2. EPIDEMIC AND ENDEMIC DISEASES

(i) *Yellow Fever* : No case of Yellow Fever was reported this year. 120 cases with 88 deaths were reported last year from Southern Fung of Blue Nile Province.

Due to an outbreak of Yellow Fever in Ethiopia in April, 1961, 45,411 persons were inoculated and anti aedes measures were taken on the bordering area of the Upper Nile Province.

(ii) *Anthrax* : 273 cases with 3 deaths were reported out of which 233 cases were from Kassala Province.

(iii) *Cerebro-spinal Meningitis* : 7,837 cases with 461 deaths were reported This is the highest figure recorded since 1957. The highest incidence was i Khartoum and Darfur Provinces.

The flare-up of Cerebro spinal Meningitis is mainly attributed to the seasona influx into the Sudan of pilgrims from Equatorial Africa.

TABLE XIII

Cerebro-spinal Meningitis

Recorded Incidence and Fatality by Provinces during 1960/61

PROVINCE	Cases	Deaths	Fatality Rate
Bahr El Ghazal	199	39	19.6
Blue Nile	1,030	84	8.2
Darfur	2,325	81	3.5
Equatoria	190	44	23.2
Kassala	81	8	9.9
Khartoum	2,981	104	3.5
Kordofan	669	62	9.3
Northern	236	16	6.8
Upper Nile	126	23	18.3
TOTAL ...	7,837	461	5.9

TABLE XIV

Cerebro-spinal Meningitis

Recorded Incidence and Fatality in the Last Ten Years

YEAR	Recorded Cases	Recorded Deaths	Fatality
1951/52	14,527	2,031	14.0
1952/53	2,938	644	21.9
1953/54	8,942	827	9.2
1954/55	3,470	492	14.2
1955/56	9,028	828	9.2
1956/57	5,888	578	9.8
1957/58	2,008	178	8.9
1958/59	1,179	208	17.6
1959/60	1,459	181	12.4
1960/61	7,837	461	5.9

(iv) *Diphtheria* : 691 cases with 48 deaths were reported as compared with 940 cases and 91 deaths last year.

Table XV

Diphtheria : Recorded Incidence and Fatality by Provinces 1960/61

Province	Cases	Deaths	Fatality Rate
Bahr El Ghazal	2	--	--
Blue Nile	109	12	11.0
Darfur	--	--	--
Equatoria	10	--	--
Kassala	101	10	9.9
Khartoum	316	9	2.8
Kordofan	44	5	11.4
Northern	103	11	10.7
Upper Nile	6	1	16.7
TOTAL ...	691	48	6.9

Table XVI

Diphtheria : Recorded Incidence and Fatality in the Last Ten Years

Year	Cases	Deaths	Fatality Rate
1951/52	280	30	10.7
1952/53	717	37	5.2
1953/54	335	27	8.1
1954/55	369	61	16.5
1955/56	356	38	10.7
1956/57	1,497	52	3.5
1957/58	506	38	7.5
1958/59	859	52	6.1
1959/60	940	91	10.3
1960/61	691	48	6.9

(v) *Dysentery* : 4,694 cases were treated in hospitals and 243,108 as out-patients.

(vi) *Enteric Fever* : 578 cases with 14 deaths were reported during the year.

Table XVII

Enteric Fever : Province Distribution 1960/61

Province	Cases	Deaths
Bahr El Ghazal	1	1
Blue Nile	290	6
Darfur	—	—
Equatoria	9	—
Kassala	33	—
Khartoum	155	6
Kordofan	6	—
Northern	74	1
Upper Nile	10	—
Total ...	578	14

Table XVIII

Enteric Fever : Recorded Incidence in the Last Ten Years

Year	Recorded Case	Deaths
1951/52	578	52
1952/53	598	63
1953/54	560	42
1954/55	548	34
1955/56	449	23
1956/57	410	31
1957/58	361	32
1958/59	687	19
1959/60	763	35
1960/61	578	14

(vii) *Gastro-Enteritis of Children* : Records of hospitals and dispensaries registered 178,743 cases of which 5,151 required hospitalization, with 424 deaths, with a fatality rate of 8.2 per cent of the total admissions.

(viii) *Leprosy* : During the year 730 new cases were diagnosed of which 494 were equally distributed between Equatoria and Bahr El Ghazal Provinces.

(ix) *Poliomyelitis* : 119 cases recorded this year of which 95 received hospital treatment ; none was fatal. Last year 328 cases with 30 deaths were reported.

(x) *Hydrophobia* : 11 cases of human rabies were recorded during the year.

(xi) *Small Pox* : The total number of cases reported was 162 with no deaths as compared with 336 cases and 9 deaths last year. 146 of this year's cases were reported from the Blue Nile Province.

Province distribution of Small Pox vaccinations done during the year was as follows :—

Bahr El Ghazal	1,548
Blue Nile	996,163
Darfur	83,065
Equatoria	236,536
Kassala	17,166
Khartoum	178,263
Kordofan	7,122
Northern	250,970
Upper Nile	59,323
TOTAL	1,830,156

TABLE 19

Incidence of Small Pox and Vaccinations Performed in the Last Ten Years

YEAR	Cases	Vaccinations Performed
1951/52	346	593,372
1952/53	3,670	1,008,581
1953/54	3,030	1,500,000
1954/55	4,200	1,203,673
1955/56	1,427	1,748,190
1956/57	25	648,501
1957/58	295	2,678,223
1958/59	380	2,440,084
1959/60	316	633,275
1960/61	162	1,830,156

(xii) *Influenza* : 72,025 cases with 36 deaths were reported compared with 146,123 and 75 deaths last year.

(xiii) *Tuberculosis* : The Mass B.C.G. Campaign ended during May, 1960. Permanent B.C.G. Centres are now established at Wad Medani Tuberculosis Demonstration and Training Centre, Khartoum Chest Hospital, Wau, El Obeid, Kassala, Atbara and Port Sudan Hospitals. In Khartoum Province work was done in the Three Towns, Rural Dispensaries, Industrial Firms, Prisons, Hospitals, Army Units and Health Centres.

During the year the following tests and vaccinations were performed in the various B.C.G. Centres :—

Centre	Number Tested	Number Vaccinated
T.B. Division H.Q.	19,442	9,836
Kassala	10,992	5,401
Wau	1,975	435
Port Sudan	2,243	490
Thawra Hospital	7,867	1,353
Atbara	7,141	3,720
Medani	16,216	5,260
El Obeid	25,133	12,896
Total ...	91,009	39,391

Table XX

Tuberculosis : Province Distribution of Admissions to Hospitals
1960/61

Province	Pulmonary	Non-Pulmonary	Total
Bahr El Ghazal	273	86	359
Blue Nile	837	370	1,207
Darfur	143	17	160
Equatoria	289	64	353
Kassala	588	187	775
Khartoum	1,080	246	1,326
Kordofan	470	145	615
Northern	308	78	386
Upper Nile	414	117	531
Total ...	4,402	1,310	5,712

Note : Figures for Pulmonary Tuberculosis in Khartoum Province include cases coming from the other Provinces to the capital for specialist advice.

Table XXI

Tuberculosis: Admissions to Hospitals in the Last Ten Years

Year	Pulmonary	Non-Pulmonary	Total
1951/52	1,325	747	2,072
1952/53	1,679	671	2,350
1953/54	2,075	798	2,873
1954/55	2,868	915	3,783
1955/56	2,697	823	3,520
1956/57	3,175	1,005	4,180
1957/58	3,749	1,061	4,810
1958/59	3,864	1,135	4,999
1959/60	4,263	1,297	5,560
1960/61	4,402	1,310	5,712

TABLE XXII

Tuberculosis: Age Distribution of 5,248 of the Cases Admitted to Hospital 1960/61 *No. of Persons and Percentages*

Tuberculosis	AGE GROUP IN YEARS									
	0-1	1-5	6-15	16-25	26-35	36-45	46-65	Over 65	Undefined	Total
Cases Pulmonary	6	23	176	891	1,622	843	415	98	18	4,092
Percentage ...	0.1	0.6	4.3	21.8	39.6	20.6	10.1	2.4	0.4	100.0
Cases Non-Pulmonary	9	43	161	243	308	230	128	33	1	1,156
Percentage	0.8	3.7	13.9	21.0	26.6	19.9	11.1	2.9	0.1	100.0

Table XXIII

Tuberculosis: Site of Main Lesion in 1,156 *of the Non-Pulmonary Cases Admitted to Hospitals* 1960/61

Site of main lesion	Cases	Percentage
Gland	409	35.4
Bone	337	29.2
Joint	162	14.0
Abdominal	143	12.4
Skin	64	5.5
Genito-urinary	26	2.2
Meningeal	15	1.3
Total ...	1,156	100.0

TABLE XXIV

Tuberculosis : 1960/61 *Province Distribution of all Cases Diagnosed*

PROVINCE	Pulmonary	Non-Pulmonary	Total
Bahr El Ghazal	567	298	865
Blue Nile	1,462	1,310	2,772
Darfur	277	104	381
Equatoria	351	153	504
Kassala	1,125	1,052	2,177
Khartoum	1,515	706	2,221
Kordofan	661	518	1,179
Northern	733	804	1,537
Upper Nile	1,173	1,372	2,545
TOTAL ...	7,864	6,317	14,181

3. HELMENTHIC DISEASES

(i) *Ancylostomiasis* : 12,864 cases were recorded, of these 12,395 cases were reported from the Southern Provinces.

(ii) *Dracontiasis* : 4,036 cases were treated during the year, of these 3,036 were

(iii) *Bilharzia* : 52,877 cases were recorded during the year.

BILHARZIA IN GEZIRA IRRIGATED AREA

Extract from the Annual Report of Blue Nile Province, Northern Division—Gezira Irrigated Area

In the Gezira Irrigated Area research is being carried out to evaluate the efficiency and cheapness of Snail Control by chemical barriers in the old Gezira and mechanical barriers in the new Managil Extension. The whole canalisation system is under continuous surveillence for snail infestations. Bilharzia examination and treatment teams are dealing with the positive cases when and where found.

Chemical Barriers (Old Gezira Canalisation System).

About 350 tons of Copper Sulphate were used for the continuous application for the chemical barriers. 150 tons were used for the massive sulphation of the different snail infestations detected.

The following table shows the number of times bilharzia snail vectors were found passing the chemical barriers in each major canal system.

Major Canal System	Species of Snails Biomphalaria and Bullinus	Total No. of Times Infestation Found	Position of Infestation
Lemon	Biom- & Bul-phalaria linus	2	In different position.
Hag Abdalla ...	,, ,,	3	1st and 2nd in same position.
Wad Figda ...	,, ,,	3	1st and 2nd in same position.
Bilawi	,, ,,	3	1st. and 2nd in same position
Heweiwa	,, ,,	2	In different position.
Zananda	,, ,,	3	2nd and 3rd in same position.
Mukhtar	,, ,,	3	2nd and 3rd in same position.
G. Mokhtar	,, ,,	2	In same position.
G. Zananda ...	,, ,,	2	In same position
Nawral	,, ,,	2	In different position
Shukaba	,, ,,	3	1st and 2nd in same position
Um Teribat ...	,, ,,	3	1st and 2nd in same position.
Wad Shannan ...	,, ,,	2	In different position
Mubarak	,, ,,	3	1st and 2nd in same position
Hag El Nur ...	,, ,,	3	2nd and 3rd in same position.
Medani	,, ,,	3	1st and 2nd in same position
Abyadani	,, ,,	3	1st and 2nd in same position.
Wad Hilal	,, ,,	3	1st and 2nd in same position
Porabeil	,, ,,	3	1st and 2nd in same position.
Porabeil North ...	,, ,,	2	In different position
Porabeil South ...	,, ,,	2	In different position.
Basatna	,, ,,	2	In different position
Abdel Dayem ...	,, ,,	3	1st and 2nd in same position
Warag	,, ,,	3	2nd and 3rd in same position.
Tayba	,, ,,	3	1st and 2nd in same position
Gamosi	,, ,,	3	1st and 2nd in same position.
Massalamia	,, ,,	3	1st and 2nd in same position
Massalamia North	,, ,,	2	In different position.
Wad Nalal	,, ,,	3	In different position
Abdel Aziz ...	,, ,,	2	In different position
G. Gamousi ...	,, ,,	2	In different position
Sharafat	,, ,,	2	In same position.
Talbab	,, ,,	2	In different position
A/Frough	,, ,,	3	1st and 2nd in same position.
Debeiba	,, ,,	3	1st and 2nd in same position.
Abu Usher	,, ,,	2	In different position.
Wad El Magdi ...	,, ,,	3	In different position.
Reihama	,, ,,	3	In different position.
Turabi	,, ,,	2	In same position.
H. Gueiha	,, ,,	3	1st and 3rd in same position.
G. Gueiha	,, ,,	2	In different position.
Kab El Gidad ...	,, ,,	3	In different position.
Um Odam	,, ,,	2	In different position.
Wadi Shaier ...	,, ,,	3	1st and 2nd in same position
Ketier	,, ,,	2	In different position.
Wagara	,, ,,	3	In different position
Abu Guta	,, ,,	3	In different position.
Agud	,, ,,	3	In different position.
MANAGIL SCHEME			
Managil Br. ...	,, ,,	3	In different position.
Huda	,, ,,	3	In different position.
Wad El Mansi ...	,, ,,	2	In different position.
Kamil Nomak ...	,, ,,	2	In same position.
Ureiga	,, ,,	1	Nil.
Azazi	,, ,,	2	In different position.

MECHANICAL BARRIERS (NEW MANAGIL EXTENSION)

Seven Mechanical Barriers are installed in the system. The first barrier is seven kilometres from the Sennar Dam.

The following table shows the number of snails caught at first barrier at kilometre 7 (the first mechanical barrier or first trap) :—

Month	Bullinus	Biomphalaria	Other
July	—	—	21
August	—	—	25
September	37	—	76
October	65	—	100
November	79	6	112
December	87	15	127
January	101	20	145
February	112	27	179
March	135	80	193
April	19	—	65
Total ...	635	148	1,043

Trap No. 2 at K. 35 : No snails were caught.

Trap No. 3 at K. 51 : No snails were caught.

Trap No. 4 at K. 57 : No snails were caught.

Trap No. 5 at K. 69 : No snails were caught.

Trap No. 6 at K. 122 : 17 Bullinus and 3 Biomphalaria were detected once during April, 1961.

Trap No. 7 at K. 134 : 10 Bullinus and 5 Biomphalaria were detected once during March, 1961.

The following table show the number of floating snails detected on the first seven kilometre length of the new main canal.

Month	Bullinus	Biomphalaria	Other
July	—	—	—
August	—	—	—
September	—	—	—
October	9	—	31
November	15	—	38
December	27	2	56
January	35	—	61
February	39	1	69
March	43	1	75
April	9	—	25
May	—	—	—
June	—	—	—
Total ...	177	4	355

The following table shows the number of times the bilharzia snail vectors were found in the major canals passing the mechanical barriers :—

Major Canal System	Species of Snail	Total No. of Times Infestation Found	Position of Infestation
Mongataa	Bio- & Bullinos mphalaria	3	In different position.
Maatouk	,, ,,	2	
Baasheim	,, ,,	—	In different position.
Balayia	,, ,,	—	
Fakhakheir	,, ,,	—	
Hafayer	,, ,,	—	
Omar	,, ,,	—	
Kawa i	,, ,,	—	
W. Dowra	,, ,,	—	
Azazab	,, ,,	—	
Gamousi	,, ,,	—	
Kabogà	,, ,,	—	
Snawal	,, ,,	—	
Taki	,, ,,	—	
Tahamid	,, ,,	—	
Wad Abid	,, ,,	—	

The following table shows bilharzia cases selected at random and followed up in elementary schools.

The new entrants into the schools mentioned below have been examined since 1957. The age is roughly seven years. The figures are tabulated below for comparison. It is very clear that there is a steady decrease in the incidence of bilharzia infection in the entrants.

School	1957			1958			1959			1960			1961		
	Exam.	Inf.	%	Exam.	Inf.	%	Exam.	Inf.	%	Exam.	Inf.	%	Exam.	Inf.	%
Laota	50	20	40	52	9	17	48	3	6.2	50	2	4	45	2	4.4
Sueiha	50	17	34	49	11	22	50	2	4	50	—	—	47	—	—
Mugdi	46	22	49	51	10	20	31	—	—	48	—	—	44	—	—
El Wali	52	18	35	51	8	16	53	—	—	50	1	2	53	1	1.8
Fugara	45	18	40	47	8	17	50	3	6	50	2	4	52	1	2
Wad Sulfab	42	16	38	43	7	16	53	3	5.6	52	2	3.9	50	2	4
W/Carey	43	17	40	47	6	13	50	—	—	45	—	—	50	1	2
W/Gamal	46	14	30	46	9	19	52	4	9.3	50	3	6	50	3	6
Radma	50	15	28	48	12	20	52	7	3.5	53	5	9.4	50	2	4
Kummur	50	15	30	46	5	11	51	2	4	48	2	8	50	—	—
Baluir	46	15	32	57	7	12	50	—	—	45	—	—	51	1	1.9
Shukaba	47	4	8.53	50	4	8	52	2	7.7	50	2	4	48	1	2.8
Ghubshan	41	21	50	48	12	25	45	4	8.8	46	3	6.6	50	3	6
Tebub	50	17	34	50	6	12	50	4	8	50	1	2	50	1	2
Tayba	50	5	10	50	3	6	50	2	4	53	2	3.8	50	1	2
Azaza	52	4	7	50	3	6	50	2	4	52	2	3.9	51	2	3.9
W/Hussien	50	10	20	50	6	12	47	4	8.5	—	—	—	50	—	—
W/Rahma	50	7	14	51	4	8	52	1	1.9	53	1	1.8	53	1	1.8
W/Raya	42	2	5	50	2	4	50	2	4	52	2	3.9	53	2	2
Total ...	902	257	28.3	936	132	14.0	979	45	4.6	897	30	3.3	947	24	2.4

TABLE 25

Bilharzia in Gezira Irrigated Area 1957/58 *to* 1960/61

YEAR	HAEMATOBIUM						MANSONI					
	CHILDREN			ADULTS			CHILDREN			ADULTS		
	Examined	Found	infected	Examined	Found	infected	Examined	Found	infected	Examined	Found	infected
	No.	No.	%	No.	No.	%	No.	No.	%	No.	No.	%
1957/58 ...	36,133	1,057	2.9	56,961	961	1.7	36,133	1,859	5.1	56,961	3,873	6.8
1958/59 ...	40,260	912	2.3	48,245	823	1.7	40,260	1,807	4.5	48,245	2,500	5.2
1959/60 ...	61,314	1,306	2.1	84,678	1,459	1.7	61,314	2,892	4.7	84,678	4,209	5.0
1960/61 ...	69,589	956	1.4	97,798	1,190	1.2	69,589	3,201	4.6	97,798	4,583	4.7

TABLE 26

Bilharzia : Province Distribution 1960/1961

PROVINCE	Cases	Deaths
Bahr El Ghazal	956	9
Blue Nile	17,910	18
Darfur	6,036	—
Equatoria	5,355	8
Kassala	513	1
Khartoum	6,437	6
Kordofan	10,090	—
Northern	5,421	—
Upper Nile	159	—
TOTAL ...	52,877	42

TABLE 27

Bilharzia : Incidence in the Last Ten Years

YEAR	Cases
1951/1952	29,987
1952/1953	29,286
1953/1954	30,725
1954/1955	37,570
1955/1956	31,741
1956/1957	43,863
1957/1958	41,645
1958/1959	45,094
1959/1960	47, 45
1960/1961	52,877

(E) SANITARY CIRCUMSTANCES

Water Supplies : Improvement of town and rural water supply continues. Controlled water yards and protected Haffirs and deep bore wells for rural and nomadic areas are expanding.

Refuse Disposal : Mainly in towns, this is being carried out by orthodox methods of daily collection, dumping and burning.

Sewage Disposal : The sewage works in Khartoum Town are gradually replacing the bucket system. It has not yet covered the whole town.

In other towns bucket system, aqua privy, septic tank and pit latrine are in use.

Housing and Town Planning : The usual measures to ensure good housing and avoid overcrowding and insanitary conditions are being taken by the authorities concerned in re-planning, town expansion and new layouts.

CHAPTER IV

SOCIAL HYGIENE

Midwifery: The following table shows the midwifery training schools, date of foundation of each school, total number of midwives trained and number under training during 1960/1961.

TABLE 28

Midwifery Training Schools

SCHOOL	Date of Opening	Total Midwives Trained Since Opening	No. of Midwives under Training During 1960/61
Omdurman	1920	956	36
El Obeid	1948	164	12
Juba	1950	45	9
Malakal	1952	34	8
Medani	1953	191	18
Atbara	1955	67	16
Kassala	1957	13	6
El Fasher	1958	10	6
TOTAL ...		1,390	111

TABLE 29

Distribution of Licensed Midwives in the Sudan

PROVINCE	District Midwives	Certificated Nurse Midwives	Staff Midwives	Sisters	Health Visitors	Uncertificated Nurse Midwives	Total
Bahr El Ghazal	13	—	—	—	—	2	15
Blue Nile	199	19	4	4	11	10	247
Darfur	44	4	3	3	2	1	57
Equatoria ...	28	1	1	1	1	23	55
Kassala	21	2	3	2	2	—	30
Kassala N.A. ...	31	6	1	2	3	1	44
Khartoum ...	151	44	12	9	10	—	226
Kordofan ...	130	13	4	3	2	3	155
Northern	175	12	4	3	4	4	202
Upper Nile ...	43	1	1	1	1	—	47
TOTAL ...	835	102	33	28	36	44	1,078

Table 30

New Midwifery Certificates Issued During the Year

Province	Certificated Nurse Midwives	Village Midwives	Total
Bahr El Ghazal	—	3	3
Blue Nile	5	16	21
Darfur	1	6	7
Equatoria	—	8	8
Kassala	1	15	16
Khartoum	8	9	17
Kordofan	7	12	19
Northern	5	16	21
Upper Nile	—	8	8
Total ...	27	93	120

Cases attended by student midwives were as follows :—

School	Normal Delivery	Transferred to Hospital	Total
Omdurman	1,111	53	1,164
El Obeid	292	17	309
Medani	405	80	485
Malakal	217	21	238
Kassala	249	23	272
Juba	249	25	311
Atbara	286	7	332
El Fasher	249	45	294
Total ...	3,134	271	3,405

Health Visitors School—Omdurman

The school was first opened during November, 1959.

The course is one academic year.

The Canadiate must possess, elementary school certificate, nursing certificate, midwifery certificate and staff midwife certificate before joining the school.

Total number of Health Visitors graduates from School till now is 25.

There are 10 students in the school at present.

MATERNAL AND CHILD HEALTH

Improvement and expansion in this important service continued. Two new Maternity and Child Welfare Centres were opened during the year and training of staff maintained.

Unicef is assisting by provision of necessary equipment and books for training and supply of milk and vitamins for use in the Centres.

The list below shows localities where Centres were operating :—

HEALTH CENTRES

Khartoum	8
Omdurman	5
Khartoum North	4
Medani	2
Dueim	1
Kosti	1
Singa	1
Hassaheisa	1
El Hosh	1
El Fasher	1
Geneina	1
Juba	1
Kassala	1
Port Sudan	4
El Obeid	1
El Nahud	1
Wad Elias	1
Ed Damer	1
Atbara	1
Shendi	1
Malakal	1
TOTAL ..	39

The following are ante-natal elinics where, due to shortage of Health Visitors and other trained staff, only ante-natal work is carried out :—

Wau
Kwojok
Rumbek
Aweil
Tonj
Sennar
Bakht El Rudu
Abu Usher
Rufaa
Kurmuk
Tendelti
Nyala
Zalingei
Lui
Mondri
Torit
Sources Yubu
Li Rangu
Yei
Maridi
Kopoeta
Sinkat
Gedaref
Abu Deleig
Um Ruaba
Kadugli
Talodi
Heiban
Abu Gebeiha
Rigal El Fula
Dilling
Bara
Berber
Merowe
Dongola
Wadi Halfa
Abri
El Dakhla
Darmali
Fangok
Bentui
Bor
Renk
Nasir

TABLE 31

Activities of Maternity and Child Welfare Centres and Anti-Natal Clincs Throughout the Sudan for the Year 1960/61

PROVINCE	No. of Clinics M.C.W. & Ante-Natal	Ante-Natal Attendances in all Clinics	No. of Home visits	No. of Health Centres	Child Attendance at M.C.W. Centres	No. of Deliveries by Trained Midwives
Bahr El Ghazal ...	5	4,674	—	—	—	452
Blue Nile	14	56,667	4,568	7	38,784	2,690
Darfur	4	6,908	1,282	2	10,449	749
Equatoria	8	4,798	1,046	1	6,957	112
Kassala	9	35,642	2,464	5	48,512	2,112
Khartoum	19	84,954	10,511	17	108,888	10,279
Kordofan	11	16,098	1,014	3	7,982	1,224
Northern	10	22,850	2,829	3	25,592	1,647
Upper Nile	7	11,088	562	1	7,300	428
TOTAL	87	243,679	24,366	39	253,564	19,684

MEDICAL EXAMINATION OF SCHOOL CHILDREN

School Medical Service : The following table summerises the result of Medical Examination of school children in the provinces.

TABLE 32

PROVINCE	No. of Children Examined	NUMBER OF CASES FOUND OF						
		Trachoma	Bilharzia	Enlarged Spleen	Pulmonary T.B.	Ancylostoma	Dental Caries	All Other Diseases
Bahr El Ghazal	1,071	10	4	120	- -	33	- -	25
Blue Nile ...	39,477	3,703	1,405	1,242	- -	160	142	846
Darfur	15,769	2,224	1,140	1,522	- -	1,035	- -	227
Equatoria ...	7,571	408	318	1,320	- -	924	- -	- -
Kassala ...	17,488	2,183	44	206	1	- -	- -	- -
Khartoum ...	10,641	637	—	24	- -	- -	- -	—
Kordofan ...	11,022	691	1,284	1,273	- -	8	- -	51
Northern ...	35,677	7,947	1,311	116	- -	- -	1,503	70
Upper Nile ...	4,594	501	17	147	2	3	- -	150
TOTAL ...	143,310	18,304	5,523	5,970	3	2,163	1,645	1,369
PERCENTAGE ...	100.0	12.8	3.9	4.2	- -	1.5	1.1	1.0

Mental Health : 12,438 cases were seen during the year by the Psychiatris at the Clinic for Nervous Disorders, 6,384 were interviews for males and 6,054 in terviews for females. Approximately 2,000 were new patients the balance represent ing the return attendances.

The number of Medico-legal cases interviewed at Kober Institution is 691.

The Mental Diseases Board saw 19 cases during the year. The findings of the board were as follows :—

6 cases fit for Government Service.

2 cases unfit for Government Service.

11 cases fit for temporary service or referred for treatment and to re-appear before the board at specified dates.

Health Education

The weekly radio talks, exhibition of posters during tribal gatherings and Agricultural shows, and press articles remained to be the media for Health Education.

The budding audo-visual aid unit in Khartoum continued its activities and is attempting to produce local films on the local health problems of the country.

CHAPTER V

PORT HEALTH QUARANTINE

Sea and Air ports remained clear of infection during the season.

Disinfection of aircraft and quarantine control of air travellers were undertaken at Wadi Halfa, Port Sudan, Khartoum, Juba, Malakal, Kassala, Geneina, El Fasher, and El Obeid.

The Aedic Index was calculated on an inspection of all habitations within the area concerned. The following table shows the aedic index throughout the year at the local airports on the international routes :—

TABLE 33

Aedes Aegypti Index 1960/61

MONTH	Fasher	Juba	Kassala	Port Sudan	Khar-toum	El Obeid	Wadi Halfa	Malakal
July	0	0	0	0	0	0	0	0
August ...	0	0	0	0	0	0.01	0	0
September ...	0	0	0	0	0	0	0	0
October ...	0	0	0	0	0	0	0	0
November ...	0	0	0	0	0	0	0	0
December ...	0	0	0	0	0	0	0	0
January ...	0	0	0	0	0	0	0	0
February ...	0	0	0	0	0	0	0	0
March ...	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0
May	0	0	0	0	0	0	0	0
June	0	0	0	0	0	0.01	0	0

Port Sudan Quarantine

Total ships inspected were 1,310 of which 565 were given Radio Pratique.

Suakin Quarantine

The number of pilgrims who left Suakin for Jeddah in the last 10 years was as follows :

Year	No. of Pilgrims
1951/1952	6,491
1952/1953	13,051
1953/1954	13,950
1954/1955	13,921
1955/1956	11,427
1956/1957	23,811
1957/1958	29,618
1958/1959	17,356
1959/1960	16,824
1960/1961	19,663

Total pilgrims who left by air from Port Sudan during the season was 3,511.

All out-going pilgrims were compulsorily immunised against Cholera, Small-pox and Yellow Fever.

The pilgrimage was declared free from epidemic and quarantinable diseases.

Khartoum North Pilgrims Transit Camp

1,687 pilgrims passed through the camp during the period 12.3.61 to 31.5.61 and received the necessary inoculations against Cholera and Yellow Fever and were vaccinated or revaccinated against Small-pox before their departure.

Medical Mission to the Hedjaz

The Mission consisted of two doctors, three medical assistants and 14 nurses, midwives and other staff.

Treatment Centres were established at Jeddah, Mecca, Muna and Medina. Medical care and attention was given to all who sought it ; pilgrims and local inhabitants. 18,797 patients were attended to and 85 were admitted to hospital.

Wadi Halfa Quarantine

Examination of labourers coming from Egypt was carried out as usual. 380 river vessels and 430 aircraft were inspected during the year. 12,701 vaccinations against Small-pox were done in the quarantine. The total number of persons who passed through Wadi Halfa quarantine was 38,575.

Geneina Quarantine

38,419 persons passed through this quarantine. 3,589 vaccinations against Small-pox were done.

CHAPTER VI

MEDICAL TRAINING

School of Hygiene

20 students were under training in the First Class.

Basic education requirement for entry into the school is completion of secondary education. The students take a three years' course at the end of which they must pass the Royal Society of Health Examination.

In their first year of study the students are given General Science, Building Science, Drawing and Construction Technicology. Levelling and Geometry in the Khartoum Technical Institute.

During the school vacation, the students receive further practical rural tuition in the provinces.

Medical Assistants Training School

32 students were under training. One student died during the year as a result of a car accident.

Training of Nurses 1960/1961

42 hospitals are now recognised as local training centres for hospital nurses.

354 nurses successfully passed the examination ; of these 286 were males and 68 were females.

Laboratory Technicians and Assistants

5 Laboratory Technicians, 2 of whom were alien were under training during the year.

One Laboratory Technician was seconded for a period of two years to the World Health Organization to be in charge of a newly established tuberculosis laboratory in Mogadishu, Republic of Somalia.

36 laboratory assistants (6 of whom were alien—5 from Yemen and one from Somalia sent by W.H.O.) were trained during the year.

Eight laboratory assistants were given refresher courses on advanced laboratory technique including the Kahn test.

Dispensers Training School—Khartoum Hospital

The School of Dispensers was opened in 1932 with the intake of four candidates with the knowledge of Arithmetic and English Language and the course then was 6 months.

In 1956 the course was extended to two years, and in 1957 the standard for admission was raised to the General Secondary School Certificate or its equivalent and the course of study was then extended to three years.

The curriculum of the course includes recapitulation of Basic Sciences, *i.e.* Elementary Chemistry, Elementary Physics and Biology. Stress is made on Practical Dispensing and Pharmaceutics.

25 Dispensers graduated to date and they are filling posts in the big Hospitals.

The total number of students in the school at present is 9 (6 in the first class and 3 in the second) including one from Somalia on a W.H.O. Fellowship. The tenth student had to leave the school on resignation.

Training of Radiographers

Ten candidates were taken in 1961 including one Yemenese on a W.H.O. Fellowship.

The School of Radiography gives a course of training for two years for candidates of school certificate level.

Theoretical teaching is given in Electricity, Photography, Anatomy, Nursing as well as in radiographic methods and practice. All allied fields of study are dealt with according to their degree in connection with radiography.

Practical radiography, dark room practice and the practical handling of machines, X-ray hazards and all allied subjects are dealt with.

For the first time, a girl student was taken in and she is now in her second year.

Two trainees had to leave the school on account of ill health.

Eye Hospital—Khartoum

An Ophthalmic Assistants School had been established in 1953, and the intake was two students every two years.

Students for the school are always selected from the certified mumarids (Rais Anbar or Wakil Rais Anbar Status). The duration for studies in the school is two years. The students have studies on Eye Diseases, Elementary Anatomy and Physiology, and Diseases which had an effect on the eye.

The intake was increased to 5 during 1955 and 1957 and to 10 during 1959 and 1960.

So far 22 Ophthalmic Assistants graduated.

10 Students are at present in the School.

Training of Other Staff

The School of Training of Higher Nurses and Dental Assistants is mentioned under the W.H.O. Assisted Projects.

The Training of Midwives and Health Visitors is mentioned under the Chapter of Social Hygiene.

EXISTING HOSPITALS, DISPENSARIES AND DRESSING STATIONS AND BEDS AVAILABLE

TABLE 34

PROVINCE	Hospitals (60)	BEDS IN HOSPITALS				Total	Dispensaries	Beds in Dispensaries	Total Beds in Hospitals & Dispensaries	Dressing Stations	Population	Beds per 1,000 Population (Hospitals & Dispensaries)
		General	T.B.	Children	Maternity							
Bahr El Ghazal	Wau ...	191	60	8	9	268						
	Rumbek ...	127	—	—	—	127						
	Aweil ...	46	—	—	—	46	14	181	702	47	1,218,000	0.58
	Raga ...	40	—	—	—	40						
	Tonj ...	40	—	—	—	40						
		444	60	8	9	521						
Blue Nile	Medani ...	350	120	73	54	597						
	Rufaa ...	100	—	—	—	100						
	Kosti ...	148	—	—	20	168	69	121	1,875	110	2,433,000	0.77
	Dueim ...	98	16	—	16	130						
	Abu Usher	180	40	—	14	234						
	Sennar ...	156	~~24~~	8	—	164						
	Singa ...	132	24	—	19	175						
	Roseires	74	—	—	28	102						
	Kurmuk ...	84	—	—	—	84						
		1,322	200	81	151	1,754						
Darfur	Fasher ...	180	8	10	50	248						
	Nyala ...	88	—	4	8	100						
	Geneina ...	96	—	4	—	100	48	416	1,003	47	1,537,000	0.65
	Zalingei ...	75	—	—	—	75						
	Daein ...	54	—	4	6	64						
		493	8	22	64	587						

Province	Hospitals (60)	Beds in Hospitals				Total	Dispensaries	Beds in Dispensaries	Total Beds in Hospitals & Dispensaries	Dressing Stations	Population	Beds per 1,000 Population (Hospitals & Dispensaries)
		General	T.B.	Children	Maternity							
Equatoria	Juba ...	258	71	62	25	416						
	Lui ...	45	8	3	4	60						
	Maridi ...	101	19	—	9	129	71	469	1,635	68	1,048,000	1.56
	Li Rangu	109	20	—	8	137						
	Sources Yubu	115	—	—	6	121						
	Yei ...	65	14	—	4	83						
	Torit ...	123	10	—	1	134						
	Kopoeta ...	70	—	16	—	86						
		886	142	81	57	1,166						
Kassala	Kassala ...	252	42	32	16	342						
	Gedaref ...	181	24	12	4	221						
	Aroma ..	100	—	—	—	100	48	218	1,317	61	1,142,000	1.15
	Port Sudan	209	68	23	14	314						
	Tokar ...	62	—	—	—	62						
	Sinkat ...	60	—	—	—	60						
		864	134	67	34	1,099						
Khartoum	Khartoum	593	—	117	46	756						
	Thawra & Abu Anga	—	400	—	—	400						
	Omdurman	269	—	48	38	355	32	45	1,962	23	597.00	3.29
	Eye Hospital ...	105	—	13	—	118						
	Khartoum North ...	162	—	26	20	208						
	Aub Deleig	40	—	—	—	40						
	Maternity H. (Omdurman)	—	—	—	40	40						
		1,169	400	204	144	1,917						

Province	Hospitals (60)	Beds in Hospitals				Total	Dispensaries	Beds in Dispensaries	Total Beds in Hospitals & Dispensaries	Dressing Stations	Population	Beds per 1,000 Population (Hospitals & Dispensaries)
		General	T.B.	Children	Maternity							
Kordofan	El Obeid	245	48	22	45	360						
	Kadugli ...	117	8	—	3	128						
	Abu Gebeiha	80	—	12	8	100						
	Dilling ...	78	—	4	8	90	60	630	1,653	62	2,074,000	0.80
	Talodi ...	62	—	—	1	63						
	Nahud ...	105	11	9	4	129						
	Rigl El Fula	42	—	—	4	46						
	Bara ...	49	—	—	—	49						
	Um Ruaba	58	—	—	—	58						
		836	67	47	73	1,023						
Northern	Atbara ...	217	36	16	19	288						
	Halfa ...	120	46	22	14	202						
	Dongola	65	12	1	8	86	79	166	937	104	1,012,000	0.93
	Merowe ...	68	7	8	—	83						
	Berber ...	82	—	10	8	100						
	Shendi	60	—	8	4	72						
		612	101	65	53	831						
Upper Nile	Malakal ...	267	75	—	19	361						
	Bor ...	100	—	—	—	100						
	Renk ...	68	—	—	—	68	38	334	945	22	1,048,000	0.90
	Bentiu ...	82	—	—	—	82						
		517	75	—	9	611						
		7,143	1,187	575	694	9,509	459	2,520	12,029	544	12,109,000	0.99

The Radio for Hospital beds only is 0.79 per 1,000 population.

CHAPTER VIII

Proposed Expansion and Improvement in Health Services
1961/62—1967/68

A seven year plan has been prepared and will be executed over the perio
1961—1968.

The present state of medical services in the Sudan is as follows :—

Population	12,109,000
Hospitals	60
Hospital Beds	9,509
Dispensaries	459
Dressing Stations	544
Health Centres	39
Health Visitors Schools	1
Health Visitors	36
Midwifery Training Schools	8
Mobile Units	65
Medical Assistants	536
Public Health Insps. and Officers	88
Public Health Offices	80
Sanitary Overseeers	161
Nurses and Other Hospital Auxiliary Staff ..	8,169
General Doctors in Government Service ..	284
Private Practitioners	100
Private Pharmacies	35
Private Drug Stores (for wholesale dealing)	51
Private Pharmacists	55
Private Dentists	25
Private Nursing Homes	10

2. The objectives of the plan are as follows :—

To provide one Hospital for .. .. 30 to 50 thousand population

To provide one Dispensary and Medical Assistant for 15,000 ..

To provide one Health Centre for .. .. 20,000 ..

To provide 1½ Hospital Beds for .. .. 1,000 ..

To provide one Midwife for .. .. 5,000 ..

To provide one Health Visitor for every Health Centre.

To provide at least 3 Staff Midwives for each Midwifery Training School.

To provide one Doctor for every 50 Hospital Beds.

To provide a Doctor or Doctors for Casualties in O.P. Dept. of District Hospitals.

To provide Team of Specialists in Provincial Hospitals.

To provide Clinical Laboratory and Staff in Provincial Hospitals.

To provide the necessary Personnel in Headquarters and Provincial Levels for Research and Control of Endemic and Epidemic Diseases.

To provide necessary Senior Staff in Headquarters for Technical Advice and Supervision.

To provide Public Health Offices in Rural Communities and wherever a Rural Hospital is built to work as a team with Medical Officer.

To provide Mobile Units to every Administrative District for Control of Diseases and Treatment of Isolated Persons.

To provide the necessary Personnel in Headquarters to organize a Special Division for Occupational Health Services and Industrial Hygiene and to initiate four Sections at Khartoum, Port Sudan, Atbara and Wad Medani.

3. The following Table represents the existing services, future developments and the total services planned to be available by 1968.

Services	Existing	Newly Proposed Under Seven Years Plan	Total Services by 1968
Hospital	60	69	129
Dispensaries	459	179	638
Dressing Stations	544	88	632
Beds in Hospitals	9,509	11,401	20,910
Health Centres	43	86	129
Mobile Units	65	77	142
(a) Auxiliary Training Schools Post Elementary :—			
Nursing Training Schools	50	50	100
Males :—			
M. Asst. School	1	—	1
Theatre Att. School	1	—	1
N. Instructors School	1	—	1
Lab. Asst. School	1	—	1
Dental Asst. School	1	—	1
Massage School	1	—	1
Ophthalmic Asst. School	1	—	1
Asst. Anaesthesiatic School ...	1	—	1
Females :—			
N. Instructors School	1	—	1
Health Visitors	1	3	4
Staff Midwives School	8	8	16
(b) Post Intermediate :—			
S. Overseers School	1	—	1
(c) Post Secondary :—			
Dispensers School	1	—	1
Radiologists School	1	—	1
Lab. Technicians School	1	—	1
School of Hygiene	1	—	1
N. College for Girls	1	—	1
Refractionists School	1	—	1
Dental Mechanics School	1	—	1

4. The new Local Government Provincial and District Councils Ordinance will transfer the following functions and units to the Local Councils (under the Decentralisation Scheme) :—

Dispensaries

Dressing Stations.

Health Centres.

Public Health Offices.

Environmental Sanitation (also including Food and Water Supply).

Mobile Health Units.

Insect Control.

Cemetries and Burial of the Poor.

Care for Infants and Aged Persons.

Encouragement of Voluntary Health Societies.

Leper Colonies.

Common Lodging Houses.

Health Education.

Medical Inspection of Food Handlers.

As a result of the above system the following categories of staff pertaining to Public Health Care, Dressing Stations, Health Centres and Dispensaries will be transferred from the Ministry of Health Budget to Province Councils Budget.

(1) (a) All Province Medical Officers of Health.
(b) All Port Medical Officers, Port Sudan.

(2) Two Women Doctors working at Health Centres in Khartoum Province.

(3) All Senior P.H. Inspectors.

(4) P.H. Inspectors not seconded to Local Councils (P.H.I. in the Bilharzia Control is excluded).

(5) P.H. Officers and Sanitary Overseers not seconded to Local Govt. (those working in the Bilharzia Control, Malaria Pre-eradication Project and School of Hygiene are excluded).

(6) Medical Assistants working in Dispensaries and Dressing Stations.

(7) Senior Medical Assistants.

(8) Supt. Nursing Officers.

(9) All Senior Health Visitors.

(10) All Health Visitors.

(11) Senior Clerks and Clerks working in PMOH's Offices.

(12) Nurses (in various groups) working in Disp. and Dressing Stations.

(13) Other Auxiliaries such as Cooks, Mosquitomen and other Unclassified Staff belonging to PMOH's office (Dressing Stations and Dispensaries, etc.).

N.B. (1) PMOHs are shared 50 per cent between the Ministry of Health and the Province Councils.

(2) Hospital Services and Staff are the concern of the Ministry of Health.

CHAPTER IX

(a) STACK MEDICAL RESEARCH LABORATORIES

By

Dr. M. A. Haseeb

This report covers the period from July 1st, 1960 to June 30th, 1961. During this period *ad hoc* research was carried out on Kala Azar, Yellow Fever, Dried Small-pox vaccine and Scorpion venom. Summaries of these and other subjects will be found under the appropriate headings :—

A great part of the time of the staff was spent on training technicians and laboratory assistants.

Among visitors to the laboratories were Dr. Manson-Bahr who was interested in trying his skin test on cases of Leishmaniasis, and Dr. Duggan from the Wellcome Museum. The World Health Organisation Diarrhoeal Advisory Team spent three months on investigation Salmonella and Shigella Diseases.

The writer spent two months in the serum and vaccine laboratories, Agoza, Cairo studying the technique of preparing anti-scorpion serum, with a view to preparing it locally.

The writer also spent three weeks in December, 1960 attending the Unesco Regional Conference in scientific co-operation and facilities at Cairo.

EDUCATIONAL AND ROUTINE ACTIVITIES

Thirty-six laboratory assistants were trained during this period, seven of them were employed by the Army Medical Corps. Five came from the Kingdom of Yemen, one from the Republic of Somalia and the rest were employed by the Ministry of Health to fill vacancies in new Hospitals to augment the establishment of big Hospitals or to do special duties on Onchocerciasis for Halfa—Khashm el Girba move.

The candidates from Yemen and Somalia were sent by the Regional Office of the World Health Organisation. They found their studies in these laboratories extremely useful and they benefitted a great deal. They completed their course and returned home to take up jobs in their respective countries.

Eight laboratory assistants were given refresher courses of two to three months duration on advanced laboratory technique including the Kahn test.

Twelve female students from the Nursing College, Khartoum, were given practical classes in bacteriology, haematology and parasitology.

TECHNICIAN CLASS

Two more technician trainees were recruited completing a total of five students. They have continued their studies throughout the year.

One laboratory technician, Mohed. Mustafa Salih, was seconded for a period of two years to the World Health Organisation to be in charge of a newly established Tuberculosis laboratory in Mogadishu, the Republic of Somalia.

ROUTINE WORK

A summary of the routine work and research carried out during the period under review is appended to the report.

The total number of examinations was 44,920 as compared with 43,228 in th previous year and 37.324 in 1958/59.

Histological work of rather highly specialised type continues to increase.

FORENSIC MEDICINE

The teaching of forensic medicine to medical students and Police cadets of the Police College takes a good part of the time of Dr. Mirghani, the Pathologist.

The request for forensic medicine examination by the Police is increasing and covers a wide range including identifications of herbs and native drugs. The need for establishing a separate Department for this purpose is urgent.

LYMPH VACCINE

The issue of lymph vaccine was 2,410,600 doses this year compared with 1,882,900 doses last year. Dry vaccine is still being prepared on a small scale. Newly prepared batches have been sent to Dr. Krag Anderson of the Serum Institute. Copenhagen for checking.

More apparatus for the preparation of dried small pox vaccine was kindly supplied by the Regional Director. E.M.R.O.

HISTOPATHOLOGICAL SPECIMENS

Dr. Mirghani Yousif Ali, the Pathologist reports as follows :—

There is no remarkable increase in the number of biopsy specimens reaching these Laboratories compared with the previous year. However, gynaecological specimens are rapidly increasing showing a definite increase in the number of endometrial curettings. The use of the punched cards further facilitated the analysis of the findings during the year 1960/61. Although it is quite possible by the use of this record system to produce a long table of disease-organ figures, a brief presentation for the purpose of this report was decided upon. The body is divided into ten regions and the malignant tumours diagnosed are tabulated under *eight* groups. This deviation from the usual tabular analysis makes it possible to accumulate figures for total increase in malignant disease rather than by location.

Total Biopsy Specimens .. .. (July 1960—June 1961)	1,754
Total Neoplastic Disease	472
Benign Tumours	260
MALIGNANT Tumours	212

Analysis from the above figures :

Malignant Tumours :—

Classification :	Total No.
I Group (1)	
Squamous Carcinoma and Carcinoma Simplex	76
II Group (2)	
Glandular Carcinoma	30
Sarcomas	19
IV Group (4)	
Lymphomas and Vascular Tumours	9
V Group (5)	
Adamantinomas and Teratoid Tumours ..	10
VI Group (6)	
Melanoma and Retinoblastoma	24
VII Group (7)	
Secondary and Undifferentiated Tumours ..	27
VIII Group (8)	
Borderline Tumours and Carcinoma in Situ ..	17
TOTAL MALIGNANT TUMOURS ..	212

ANATOMICAL LOCATION OF MALIGNANT TUMOURS

1.	Lymphatic and Vascular	17
2.	Respiratory Tract	1
3.	Upper Digestive Tract	18
4.	Lower Digestive Tract	10
5.	Abdominal Cavity	8
6.	Urinary and Male Genital Organs	16
7.	Female Genital Tract..	58
8.	Musculo -Sketol System and Eyes	51
9.	Special Glands and Endocrine Glands ..	21
10.	Organs *not* specified	18
	TOTAL	212

Gynaecological Pathology

(out of the total biopsy specimens)

Total Gynaecological Specimens..	1,044
Total Endometrial Curettings	751
(of the total gynae. specimens)	

Out of 751 endometrial specimens examined, 582 were found to show *endomentrial phase disturbance* either associated with sterility or profuse bleeding in Metropathia.

Forensic Serology Specimens

Forensic Serology Specimens (blood and seminal stains) examined in this department reached the total of 475 specimens :—

Blood Stains	105 specimens
Seminal Stains	370 specimens
TOTAL	475 specimens

RABIES

409 brains were received of which 65 were decomposed and useless for examination ; of the remaining 344, 83 were positive for Negri bodies. This contrasts with 81 postive out of 344 brains received last year.

The species and distribution of the positive and negative in the past year is shown in the following table :—

RABIES

ANIMAL	Positive	Negative	Decomposed	Total
Dog	59	191	42	283
Camel	1	3	1	5
Donkey	9	8	6	23
Horse	—	1	1	2
Cat	2	17	6	25
Cow	1	4	—	5
Goat	19	12	4	35
Monkey	—	14	3	17
Liger	—	1	—	1
Wolf	—	1	—	1
Unknown	1	9	2	12
TOTAL ...	83	261	65	469

MALARIA

	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Total
B.T. ..	—	—	—	—	—	—	—	—	—	—	—	—	—
M.T. ...	—	—	—	1	—	—	—	—	—	—	—	2	3
O.T. ..	—	—	—	—	—	—	—	—	—	—	—	—	—
D.I. ...	—	—	—	—	—	—	—	—	—	—	—	—	—
Negative ...	42	135	101	181	202	22	36	15	27	29	27	2	819
TOTAL	42	135	101	182	202	22	36	15	27	29	27	4	822

KALA-AZAR

	Jul.	Aug.	Sept	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Total
K.A. ...	1	1	1	—	4	7	4	2	6	4	7	1	38
R.F. ...	—	—	—	—	—	—	—	—	—	—	—	—	—
Blood Counts	30	40	23	16	53	49	45	16	28	30	40	60	418
Weil-Flix	—	—	—	—	3	3	5	2	3	2	1	—	19
Positive ...	—	—	—	—	—	—	—	—	—	—	—	—	—
TOTAL	31	41	24	16	57	50	54	20	37	36	48	61	475

HETEROPHILE

Heterophile	—	—	—	—	—	—	—	—	—	—	—	—	—
Positive ...	—	—	—	—	—	—	—	—	—	—	—	—	—
Negative ...	1	—	—	—	4	1	—	—	—	—	—	—	6
TOTAL ...	1	—	—	—	4	1	—	—	—	—	—	—	6

KHAN TEST

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	Total
Positive	143	160	199	145	163	170	189	105	107	70	120	1,737
Negative	1,066	1,311	1,395	888	1,120	1,130	918	968	1,085	833	1,032	13,105
Total	1,214	1,471	1,594	1,033	1,283	1,300	1,107	1,073	1,192	903	1,152	14,842

FAECES

	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Total
Flexneri ..	—	5	6	11	12	2	3	1	5	6	4	11	66
Shiga ...	1	1	—	2	3	2	1	—	2	1	2	3	18
B. Alkalesc.	—	—	—	4	3	2	1	2	—	7	3	5	27
Ambigium	—	—	—	..	—	—	—	—	—	—	—	—	—
Sonne ...	1	2	—	—	1	3	2	—	—	1	2	1	13
[illegible] ...	—	—	4	5	2	6	7	11	1	6	2	1	45
[illegible] ...	—	—	1	—	2	—	—	1	1	1	—	—	6
[illegible] ...	1	—	—	—	1	—	—	1	—	—	—	—	3
Amoeba ...	—	1	1	—	2	1	2	—	1	—	—	—	8
Ova ...	1	2	1	1	2	—	—	1	1	2	—	—	11
Negative ...	170	365	297	268	265	234	187	264	175	158	230	241	2,854
TOTAL ..	174	376	310	291	293	250	203	281	186	182	243	262	3,051

GENERAL BACTERIOLOGICAL AND BIOCHEMICAL

		July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	Total
C.S. Fluids	P.	4	1	3	4	2	1	4	1	8	26	81	37	172
	N.	41	36	37	32	23	37	40	32	27	37	392	299	1.033
C. Diph.	P.	10	11	19	22	32	35	36	10	15	10	8	9	217
	N.	139	145	156	198	263	662	665	253	275	325	275	486	3.842
Virulence Tests		—	—	—	—	—	—	—	—	—	—	—	—	—
Spura.	P.	4	6	7	4	2	4	6	8	4	3	10	9	67
	N	42	24	47	26	28	36	40	45	32	47	26	69	453
Gen. Bact.		434	460	310	576	594	383	400	440	325	411	239	298	4.870
Biochem.		185	280	290	324	260	270	280	275	285	313	330	360	3.452
TOTAL		859	963	869	1.186	1.204	1.428	1.471	1.064	971	1.172	1.361	1.558	14.166

P : Positive N : Negative

SUMMARY OF LABORATORY EXAMINATIONS
1960/1961

Month	Khan Test	Blood	Faeces and Urine	Gen. Bact. and Bioch.	Histology	Total
uly, 1960	1,214	492	534	859	183	2,282
ugust	1,471	574	756	963	122	3,886
eptember	1,526	465	697	869	123	3,584
ctober	1,594	709	658	1,186	148	4,286
ovember	1,033	779	715	1,204	118	3,849
ecember	1,283	467	662	1,428	126	3,966
anuary, 1961 ...	1,350	493	624	1,471	179	4,067
ebruary	1,107	400	737	1,064	156	3,464
larch	1,173	446	579	971	127	3,126
pril	1,192	573	579	1,172	194	3,640
lay	963	719	596	1,361	140	3,719
une	1,152	547	665	1,358	138	4,660
TOTAL ...	14,842	6,646	7,572	14,106	1,754	44,920

Rabies Examination

Positive	83
Negative	261
Decomposed	65
TOTAL	409

Vaccine issued during 1960/1961

T.A.B.	51,650 ml.
Anti Rabic	697,750 ml.
Staphylococous	—
Doses of Vaccine Lymph	2,410,600
Cholera	39,000 ml.

RABIES VACCINE

697,750 doses were issued this year compared with 987,000 doses in the previous year. The amount issued this year is sufficient to treat 9,310 cases. The vaccine is phenolised and killed fixed virus prepared according to the recommendation of the W.H.O. meeting at Mugugo, Nairobi, 1955.

LYMPH VACCINE

186 sheep were used this year for the production of 10,416 grams of pulp with an average of 56 grams per sheep. The vaccine prepared is enough to vaccinate 2,604,000 persons. The batch of vaccine is of the glycerinated type. Great difficulty is encountered in the working of the primary freeze-dryer as it broke quite often and required continuous repair. However, small amounts of dried smallpox vaccine have been prepared and samples of which were sent to Dr. E. Krag Anderson in the Serum Institute of Denmark for checking the potency and other requirements according to international standards.

YELLOW FEVER

The outbreak of yellow fever that started in October, 1959 in the Southe Fung District and Northern Part of Upper Nile Province died out completel No more cases were reported in the area. Immunisation of the area and neighbou ing country with yellow fever vaccine was continued. Also salient areas in t Upper Nile Province and Nuba Mountains were immunised by means of the hyp spray jet-injector. The epidemiology of the outbreak is being reported separate by Satti, Haseeb and Ali Khair in a joint communication to be published in d course.

(b) ANNUAL REPORT OF THE SECTION OF MEDICAL ENTOMOLOGY FOR THE YEAR 1960/61

By

M. QUTUBUDDIN

This year the work is the Section continued on more or less the same lines as the past. Besides the usual routine work of the (1) identification of Anopheline nd Culicine larvae adults (2) collections and identification of sandflies (3) identiication of all insects of medical importance received from the various parts of the ountry, the following additional work was done. A large collection of mosquitoes as raised from the Fung area where a party under a Junior Technical Assistant om the Section worked for a period of about 7 months during the Kharif season eing about the same time as in the year 1959 when there was an epidemic of ellow fever in the area. The plan was to gain an idea of the mosquito fauna that red in the yellow fever zone during the season so that the probable vector of the isease might be determined. The collection thus made was identified and the eports sent from time to time to the Director, Medical Services, with copies to the ssistant Directors, Research and Public Health and the P.M.O.H., Blue Nile rovince (See my letters No. ME/4—10 dated 20.10.60. 22.11.60. 31.1.61, 5.3.61. 4.61 and 22.5.61).

Collections of insects of medical importance with special stress on ndflies were made from the Khashm el Girba area and the Tagali nd Um Ruaba districts of the Kordofan Province since clear cases of Kala-azar ere recently reported from these two districts of Kordofan. Detection of esistance to Chlorinated Hydrocarbons in body lice from Wad Medani was taken p as a subject of research as there was an appeal from the W.H.O. for the study f susceptibility of these insects to B.H.C., D.D.T. and Pyrethrins which is of xtreme Public Health importance. The W.H.O. has standardised a method of easuring the resistance of body lice to various insecticides and the organisation upplies a special kit devised and standardised for the purpose. As will be seen elow resistance to D.D.T. and B.H.C. was detected in the local strains of body ce since the local population of human lice has been under the pressure of B.H.C. nd D.D.T. (20% delousing powder) for over a decade. Several experiments were et up to establish the occurrence of such a resistance and a paper has been written n the findings and has been accepted for publication by the American Journal of ropical Medicine and Hygiene in its Sept. 1961 number. An abstract of this paper as already appeared in the W.H.O. Information Circular on Insecticide Resistance o. 28 March 1961, item 39, p. 12. Further, the name of the Medical Entomologist nd the address of the Medical Entomology Section, Stack Medical Research Laboratories. has been included by the W.H.O. in their "List of Research Workers on he Insecticide Resistance Problem All Over the World". Some details will now e provided in the following about the work done on different insects of medical mportance in the Section during the year.

Culicidae (*Mosquitoes*). As mentioned above mosquitoes collected from the ung area and those sent to the Section from other places (details of which are given elow and in the Appendix) were examined and reports submitted on them.

As it would appear from the aforesaid appendix 28 species of *Anopheline*, *ulicine*. *Aedine* and *Toxorhynchites* mosquitoes (adults and larvae) were recognised. f which 7 belonged to *Anopheles*. 10 to *Culex*. 8 to *Aedes*, one to *Mansonia* and ne to *Toxorhynchites*. These comprised 8 different subgenera. The total number f larvae examined was about 5,500 which the Section collected from the following

zones : (1) Fung (2) Northern Province (3) Kordofan (4) Khashm El Girba (5) Upp Nile Province and (6) White Nile area.

Among those received for identification belonged to the places given belo 1. Gedaref, 2. Port Sudan, 3. W/Medani, 4. Halfa, 5. Kurmuk, 6. W/Medani, No. 7. Equatoria, 8. Kordofan. Reports on the identification of material received fro these places were sent to the senders. Appendix B gives approximate number mosquito larvae either received or collected by the Section from different areas.

Monthly summaries of the indices of *Aedes aegypti* were reported as usual.

Mosquitoes and Yellow Fever

From a careful study of the mosquitoes of Fung given in Appendix A it appea that the classical vector of yellow fever viz., *Aedes aegypti* does not seem to bree there in large numbers. On the other hand among the *Stegomyia* species *Aed vittatus* breeds extensively and intensively. Dr. Lewis, after a study of the mosquit fauna in the Nuba mountains, had concluded that *Aedes aegypti* with its poor fligh and scanty numbers at the time of the 1940 epidemic must not have alone bee responsible for such an epidemic that spread over a vast area like that part c Kordofan. In Fung also it is not unlikely that *Aedes vittatus* may have played a important role during the 1959 outbreak. For experimental work on mosquit please see under Hatchary.

Sandflies. A large collection of sandflies was raised this year from differen places, important amongst them are Tagali and Umm Ruwaba districts of th Kordofan Province and Khashm el Girba in Kassala Province. Out of a total c 3,600 examined since late 1956, about 1,000 sandflies were collected and identifie during the period from September, 1960 to May, 1961. (Please refer to the Sectio reports sent from time to time on No. ME/4—1 dated 11.9.60, 11.3.61, 19.4.61 an 27.4.61).

The various species recognised are given in Appendix B.

It may be mentioned here that out of 32 species and 12 sub-species that are no known to occur in the Sudan 17 species and 7 sub-species have been identified durin the last 4 years. In addition to these one specie and a sub-specie from Sasreib and Umm Rahau respectively have been considered to be new to science. Both of which are being described and will be submitted to the Director for permissio to publish.

Since a large collection from different parts of the country was raised from th time the new Medical Entomologist joined the Section and since many interestin facts about a number of species have come to light along with two sandflies new t science, a paper has been written which takes into account; (1) Several new locality records for a number of species, (2) Number of abnormal morphological feature in several species (besides those already published. See Qutubuddin 1960 Annal and *Mag. Nat. Hist. Ser.* 13, vol 3, Pp 685—688), (3) The changes in the classi fication and nomenclature resulting from the latest works, (4) Monthly incidenc of species, (5) Percentages of different species, (6) Sex Ratios, (7) Distributio and Zoogeography, (8) Bionomics, (9) Discussion of relation to Leishmaniasi and (10) Description of two new sandflies.

The species of sandflies collected and identified this year are given in Appendix C Studies were also made of the laboratory bionomics of the common species *P. papata* in respect to laying of eggs and feeding during the gonotophic cycle of the specie and other interesting aspects.

Simulium. With a view to continuing the previous years' studies on *Simulium* in the Northern Province and to fill certain gaps in our knowledge of the bionomics of the species, the Medical Entomologist visited several places including Merowe and Karima from 8th to 24th January. During the time of the visit the incidence of the common species at these places viz., *S. griscolle* was not very high and in fact was just starting. In the latter part of the tour, large numbers of the pest had begun to attack human victims from about 10 o'clock in the morning to about the time of sunset. At times the species was seen entering verandahs and was proving a great nuisance. It is interesting to note that on one evening swarms of *S. griscolles* were collected round the Petromax light inside the bedroom of the Rest House at Karima. Two interesting facts emerge from this event viz.. 1. *Simulium* may enter houses under certain circumstances though not for biting. 2. *Simulium griscolle* was observed for the first time in the Sudan and is attracted to light.

Although other species of the genus have been collected in large numbers in Spey valley, Inverness-shire, Scotland from Ultra-Violet light traps by C.B. Williams and L. Davies, Petromax also gives out Ultra-Violet light. A multitude of other Deptera collected at this light at Karima is being studied. A letter to *Nature* about this interesting phenomenon will be written in due course.

Tabanidae. Although no special collection of the Surret flies was raised the following were identified from among collections of mosquitoes and other insects of medical importance made at the places named against each specie.

1.	*Atylotus agrestis* (Wied)	Chali
2.	*Pangonia magretti* Bezzi	Gedaref
3.	*Tabanus taeniola* Palisot de Beauvions	Medani
4.	*Tabanus sp.*	..

Hippoboscidae. Some examples of the species *Hippobosca camelina* were taken at Menageil.

Tachinidae. Interest was aroused in one specie of this family viz., *Cephalopina titillator* Clark when a large number of its larvae were seen coming out of the nose of camels around Medani. About 500 larvae were collected and a few adults reared from them in the laboratory. Most of the larvae are preserved in spirit.

Muscidae, apart from the common housefly, are important members of the subfamily *Stomoxidinae* and was identified in a collection from Menageil. It is *Stomoxys calcitrans*.

Calliphridae. The following species were recognised in a collection from Menageil.

1. *Chrysomyia putoria*.
2. *C. marginalis*.
3. *Sarcophaga sp.*
4. *Wohlfahrtia nuba* (Wied).

Of these, the last named viz., *W. nuba* is an important species since it belong to the same genus as the well known *myiasis* producing fly *W. magnifica*. Granthar Hill obtained the larvae of *W. nuba* from human wounds from various parts of thi country. He also used them for the healing of wounds.

Anoplura. Several hundred specimens of *Pediculus humanus* were collecte from beggars and poor people at Medani for experiments in the laboratory. A first in testing insecticides on the body lice high mortality was observed in th control. This was mainly due to starvation. To obviate this difficulty fres collections from field were subjected to these tests which gave almost 0% mortalit in the controls. It has been concluded that the local strain of *Pediculus humani corporis* has become at least 25 times more resistant to D.D.T. and B.H.C. whi its susceptibility to pyrethrins appears to be near normal.

Hatchery. Three strains of the yellow fever mosquito *Aedes aegypti* (L) a being maintained as colonies in the laboratory. These are :— (1) Susceptible chlorinated hydrocarbon insecticides from El Obeid. (2) Susceptible strain fro London. (3) Highly resistant strain from Trinidad.

Oviposition and Sex Ratio experiments are in progress.

Two strains of housefly one from Medani and one from Omdurman are bei maintained in the laboratory.

Miscellaneous. Besides the above work of the Section other activities includ the following.

I. Collections were made of scorpions of the species. *Leiurus quinquestriat* Hemprich and Ehrenfeld for the Stack Medical Research Laboratories. 2,3 specimens were sent. These were collected from several locations such as (1) fr under the debris of demolished or abandoned houses. (2) From holes, from und stones near the river bank.

II. On request from the Head of the Pre-clinical Department, Faculty Veterinary Science, University of Khartoum, 950 frogs were sent for teaching a demonstration purposes which was acknowledged by the addresses.

III. On request from Dr. Anis Mohd. Ali, Head Department, of Health, Facul of Medicine, University of Khartoum, a box containing mounted specimens insects of medical importance was sent.

Tours made by parties from the Section

The following parties visited different places in the country, the names, date of visit, duration of stay and the purpose of visit are also given :

Name	Area	From	To	Purpose
Abbas Eff.	Fung Area	3.5.60	11.11.60	Yellow fever
Mr. Qutubuddin	Karema/Merowe	8.1.61	24.1.61	*Simulium*
Abdel Karim Eff.	,, ,,	,,	,,	,,
Abbas Eff.	,, ,,	,,	,,	,,
Abdel Karim Eff.	Khashm el Girba	5.2.61	14.2.61	Insects of medical importance
Abbas Eff. and party	Kordofan	11.2.61	21.2.61	Sandflies
Abbas Eff. and Hassan	,,	14.4.61	24.4.61	Mosquitoes
El Daw and Ahmed Omer ...	Fung Area	19.4.61	20.5.61	,,
Abbas Eff.	,, ,,	2.5.61	20.5.61	,,
Abdel Karim Eff.	Khartoum	Several times for Scorpions		,,

Visitors. Medical students led by Prof. Passmour, and Dr. Ali Mohd. Fadl, visited the Section who were given brief lectures on the Medical Entomology of the Sudan and exhibits of insects of Medical and Public Health importance were displayed and explained to them.

Prof. and Mrs. B. Hocking, Head of Entomology Department, Alberta University, Canada visited the department and were with the Medical Entomologist for more than an hour discussing various problems of Medical Entomology of the Sudan since the Professor himself is a Medical Entomologist. He was on a tour of Africa visiting all institutions where entomological work pertaining to public health and preventive medicine is in progress.

Trainees. One Public Health Officer was under training in the Section for about a month on *Simulium, Onchocerciasis* etc. and four Assistant Sanitary Overseers on general training and 15 Mosquito-men for mosquito control from Gezira Irrigated Area.

Appendix A

Place	Ref. No.	Identification	Remarks
Wad Medani		*Aedes metallicus*	
Sennar		,, ,,	
Wad Medani		,, *unilineatus*	
,, ,, ...		*Culex pipiens fatigans*	
El Obeid	2146	,, *nebulosus*	
Rumbeik	2147	*Toxorhynchites*	Damaged
,, ...	,,	*Anopheles sp.*	,,
Dugbeila	2148	,, *squamosus*	Fung Area
,, ...	,,	*Culex decens*	,, ,,
Baleila	,,	,, *sp.*	,, ,,
Khor Basheer ...	,,	,, *tigripes*	,, ,,
Er Garzuq	,,	,, *univittatus*	,, ,,
Khor El Gamra ...	,,	,, ,,	,, ,,
,, Abu Sefein ...	,,	*Anopheles squamosus*	,, ,,
,, Jort	,,	,, *gambiae*	,, ,,
,, ,, ...	,,	,, *squamosus*	,, ,,
,, Meik	,,	*Culex pipiens fatigans*	,, ,,
Hafir Bais	,,	,, *univittatus*	,, ,,
,, ,, ...	,,	,, *decens*	,, ,,
Kurmuk	4-10	*Aedes vittatus*	,, ,,
,, ...	,,	*Anopheles gambiae*	,, ,,
,, ...	,,	*Culex tigripes*	,, ,,
,, ...	,,	,, *pipiens fatigans*	,, ,,
,, ...	,,	,, *nebulosus*	,, ,,
Semah	,,	,, *theileri*	,, ,,
,, ...	,,	*Aedes vittatus*	,, ,,
Manhal	,,	*Culex theileri*	,, ,,
Tertar	,,	,, ,,	,, ,,
,, ...	,,	,, *duttoni*	,, ,,
,, ...	,,	*Aedes vittatus*	,, ,,
,, ...	,,	*Anopheles gambiae*	,, ,,
,, ...	,,	*Culex tigripes*	,, ,,
Deim El Nur ...	,,	*Aedes vittatus*	Gedaref Area
,, ,, ,, ...	,,	*Culex univittatus*	,, ,,
Ulu	,,	*Aedes vittatus*	Fung Area
,, ...	,,	*Culex tigripes*	
,, ...	,,	*Aedes vittatus*	
,, ...	,,	*Culex duttoni*	
El Sama'a	,,	*Anopheles cinereus*	
Khor Arbodi ...	,,	*Culex simpsoni*	
,, ,, ...	,,	*Aedes hersutus*	
Surkum	,,	*Aedes vittatus*	
,, ...	,,	,, ,,	
Balabalei	,,	*Culex simpsoni*	
,, ...	,,	,, *univittatus*	
,, ...	,,	,, *tigripes*	
,, ...	,,	,, *perfuscus*	
,, ...	,,	*Aedes vittatus*	
Munjal	,,	*Anopheles gambiae*	
Tartar	,,	*Aedes vittatus*	
,, ...	,,	,, ,,	
Khor Belwara ...		*Culex theileri*	
Jebel Turnasi ...		,, *ethiopicus*	
Khor Arbodi ...		*Aedes vittatus*	
Jebel Turnasi ...		,, ,,	
,, ,, ...		*C. perfuscus*	
Wadaka		*An. rhodesiensis*	
,, ...		*Mansonia uniformis*	
,, ...		*Aedes (Diceromyia) furcifer*	

PLACE	Ref. No.	Identification	Remarks
Chali		*An. coustani*	
,, ...		*Aedes taylori* or *furcifer*	
,, ...		*Aedes (Aedimorphus) argenteopunctatus*	
,, ...		*Aedes (Aedi) ochraceues*	
,, ...		*Anopheles coustani*	
,, ...		*An. pharoensis*	

Appendix B

COLLECTIONS BY THE SECTION

Area	Approximate Number of Larvae
1. Fung	2,500
2. Northern Province	300
3. Kordofan	250
4. Kassala (Kashm el Girba)	500
5. Gezira	1,500
6. Upper Nile	150
7. White Nile	300

SENT FROM DIFFERENT PLACES

Area	Number	Remarks
1. Gedaref	3	Larvae
2. Port Sudan	1	Adult
3. Wad Medani	10	Larvae
4. ,, ,, ...	15	,,
5. Halfa	50	,,
6. Kurmuk	200	,,
7. Kordofan	100	,,
8. Equatoria	50	,,

Appendix C

No.	Place	Date	Species
1	Saif El Ahmar	6.4.60	*S. clydei latiterga*
2	,, ...	,,	*S. antennata*
3	,, ...	,,	*S. schwetzi*
4	,, ...	,,	*S. africana*
5	,, ...	,,	*S. bedfordi*
6	Damazin	7.4.60	*S. clydei latiterga*
7	,, ...	,,	*S. africana*
8	,, ...	,,	*S. bedfordi*
9	,, ...	,,	*S. squamipleuris*
10	Singa	,,	*S. clydei latiterga*
11	,, ...	,,	*S. antennata*
12	,, ...	,,	*S. schwetzi*
13	,, ...	,,	*S. africana*
14	,, ...	,,	*P. lesleyae*
15	Wad El Nayal	4.5.60	*S. antennata*
16	,, ...	,,	*S. clydei latiterga*
17	Wad El Kabir	7.8.60	*S. antennata*
18	,, ...	,,	*S. schwetzi*
19	,, ...	,,	*S. africana*
20	Abu Bait	4.8.60	*S. antennata*
21	,, ...	,,	*S. schwetzi*
22	,, ...	,,	*S. africana*
23	Salamat El Bei	,,	*S. clydei latiterga*
24	,, ...	,,	*S. schwetzi*
25	,, ...	,,	*S. africana*
26	,, ...	,,	*S. squamipleuris*
27	,, ...	,,	*P. langeroni orientalis*
28	Karkur	,,	*S. schwetzi*
29	El Gafla	6.2.61	*S. clydei latiterga*
30	,, ...	,,	*S. antennata*
31	Musran	9.2.61	*S. clydei latiterga*
32	,, ...	,,	*S. squamipleuris*
33	Jebel Maigal	12.2.61	*S. clydei latiterga*
34	,, ...	,,	*S. antennata*
35	,, ...	,,	*S. squamipleuris*
36	Khashm el Girba	13.2.61	*S. clydei latiterga*
37	,, ...	,,	*S. antennata*
38	,, ...	,,	*S. adleri*
39	,, ...	,,	*S. africana*
40	,, ...	,,	*P. lesleyae*
41	,, ...	,,	*P. papatasi*
42	,, ...	,,	*S. christophersi*
43	Abu Gebeiha	15.2.61	*S. antennata*
44	,, ...	,,	*S. bedfordi*
45	,, ...	,,	*S. africana*
46	,, ...	,,	*S. schwetzi*
47	Ar Rahoma	11.2.61	*S. antennata*
48	,, ...	,,	*S. bedfordi*
49	,, ...	,,	*S. africana*
50	Abu Nuwara	14.2.61	*S. antennata*
51	,, ...	,,	*S. bedfordi*
52	,, ...	,,	*S. africana*
53	,, ...	,,	*S. schwetzi*
54	,, ...	,,	*S. clydei latiterga*
55	,, ...	,,	*S. cincta*
56	Umm Brembeita	10.2.61	*S. antennata*
57	,, ...	,,	*S. africana*
58	,, ...	,,	*S. schwetzi*
59	,, ...	,,	*S. clydei latiterga*
60	,, ...	,,	*P. papatasi*

Appendix C—(*Contd.*)

No.	Place	Date	Species
61	El Masalama	13.2.61	*S. antennata*
62	,, ...	,,	*S. africana*
63	,, ...	,,	*S. schwetzi*
64	,, ...	,,	*S. clydei latiterga*
65	,, ...	,,	*S. cincta*
66	Dibello	17.2.61	*S. bedfordi*
67	,, ...	,,	*S. africana*
68	,, ...	,,	*S. schwetzi*
69	El Arina Jehdi	,,	*S. antennata*
70	,, ...	,,	*S. africana*
71	,, ...	,,	*S. clydei latiterga*
72	Abu Karshola	18.2.61	*S. antennata*
73	,, ...	,,	*S. africana*
74	,, ...	,,	*S. schwetzi*
75	,, ...	,,	*S. clydei latiterga*
76	Gardud Aulad Hameid ...	14.2.61	*S. antennata*
77	,, ...	,,	*S. africana*
78	,, ...	,,	*S. schwetzi*
79	,, ...	,,	*S. clydei latiterga*
80	,, ...	,,	*S. cincta*
81	,, ...	,,	*P. papatasi*
82	Id Ed Dam	14.2.61	*S. africana*
83	,, ...	,,	*S. clydei latiterga*
84	,, ...	,,	*S. cincta*

(c) THE WELLCOME CHEMICAL LABORATORIES

By

Abdel Hamid Ibrahim

The Wellcome Tropical Research Laboratories were founded in 1903. The Laboratories and the equipment together with a small library and museum were a gift to the Sudan Government by the late Sir Henry Wellcome, and they were housed in the Gordon Memorial College (now the University).

Dr. William Beam was appointed in 1904 as the first Government Chemist and the chemical section was then opened. After the first World War, the chemical section expanded rapidly and branch laboratories were opened at Atbara and Wad Medani.

In 1935 the Wellcome Tropical Research Laboratories, Khartoum were disbanded and the Khartoum Chemical Laboratories were placed under the control of the Ministry of Agriculture. In 1939 the Laboratories were transferred to the Ministry of Health and they now form part of the Research Section of the Ministry.

CONTENTS

STAFF

(*on 30th June*, 1961)

GOVERNMENT ANALYST

Abdel Hamid Ibrahim Suliman, M.Sc. (London) D.L.C.

ASSISTANT GOVERNMENT ANALYSTS

Riad Mansour

Rifaat Butrus Salama, M.Sc. (London) D.L.C.

Mubarak Ali Karrar, B.Sc. (London)
(on study leave in U.K.)

ASSISTANT SCIENTIFIC OFFICERS

(2 vacancies)

SENIOR TECHNICAL ASSISTANTS

Afifi Ahmed Hussein

Abu Bakr Ahmed Akour

Ahmed Abdalla Nagi

TECHNICAL ASSISTANTS

Mahadi El Tayeb Haboura

Hassan Ahmed Yasin

Salah El Din Bedawi El Sawahli

Mahmoud Abdel Ghafour

Ali El Hag Ibrahim

JUNIOR TECHNICAL ASSISTANTS

El Tahir Bedawi

Fadul El Rayah

Tawfig Salih

LIBRARIAN

El Fatih El Tahir

CLERKS

Awad Abdel Rahim

Watt Wyness Eliaba

ADMINISTRATIVE REPORT

1. Staff

(i) The re-employment of Sayed Riad Mansour was extended for two more years, to cope with the increasing volume of work.

(ii) Sayed Mubarak Ali Karrar was promoted to the vacant post of Assistant Government Analyst. Sayed Mubarak has passed his Honours Degree in Chemistry, at the University of Nottingham, scoring a Second Class (First Division) Degree.

(iii) An extra post for a clerk was established and filled, when it proved impossible for one clerk to handle the enormous volume of clerical work. A Junior Technical Assistant was also appointed.

With the promotion of Sayed Mubarak Ali Karrar, two posts of Assistant Scientific Officers remain vacant. It is expected that these could be filled when the University examination results are announced next July, 1961.

(iv) The posts for the new Pharmaceutical Section were approved. The establishment includes the following classified staff:—

Senior Pharmaceutical Chemist
Pharmaceutical Chemist
Assistant Scientific Officer
Senior Technical Assistant
Technical Assistant

The posts of Senior Pharmaceutical Chemist and Pharmaceutical Chemist have been advertised abroad, and it is expected that both or one of them will be filled by an expatriate.

2. General

(i) *Premises*

The old quarters of H.E. The Minister were evacuated and are expected to accommodate the new Pharmaceutical Section. It is hoped that within the next year the necessary fittings will be made.

Proposals for the new combined building for all the Laboratories of the Ministry have been forwarded for approval in the 1961/62 Budget. This is the first step towards the establishment of the Medical Research Institute.

A new store room for chemicals has been built and fitted with an air cooler. This has greatly relieve congestion of chemicals in the Laboratories and the old store.

(ii) *Equipment*

Many new pieces of equipment have been acquired. These include the following: a fluorimeter, a spectrophotometer, a chromatography oven, a phase contrast and dark field microscope, an epidiascope, a large furnace and a conductivity set.

Extra chemical cupboards, museum cabinets and book cases have also been acquired.

(iii) *Library*

One hundred and sixty-eight books/booklets were acquired during the year. Subscriptions in for new Journals were also started.

ANALYTICAL REPORT

The following table shows the number of samples received in different categories during the last two years.

	1960/61	1959/60
Waters and Sewages	476	403
Foods	469	396
Drugs and Pharmaceuticals	63	52
Clinical Specimens	142	89
Toxicological Specimens	141	118
Forensic Specimens	41	35
Edible Oils, Seeds and Oil Cakes	1.881	1.728
Damaged Materials	245	372
Miscellaneous	219	213
	3,677	3,406

Hence the year has shown yet another increase in samples submitted. The increase is more marked with respect to clinical specimens, food and water samples and edible oils, seeds and oil cakes.

The staff has done a good job in coping with the vast increase in work over the last two years. In 1958/59 the number of samples was 2,248. It is expected that the next year 1961/62 may prove even more busy and 4,000 samples are the estimate.

The following table gives the number of samples submitted by the various Government Departments and others during the last two years.

	1960/61	1959/60
Ministry of Health	706	651
Ministry of Agriculture	169	60
Ministry of Animal Resources	17	25
Ministry of Commerce, Industry and Supply ..	3	4
Ministry of Communications	36	33
Ministry of Works	83	148
Customs Department	31	13
Armed Forces	3	3
Sudan Police	53	59
Local Authorities	10	18
Khartoum University	4	5
Sudan Gezira Board	76	33
Other Government Establishments	16	44
Commercial Firms and Others	2,451	2,284

The fees for commercial work totalled LS. 4.939,753 m/ms. compared with LS. 4.846.612 m/ms. for last year.

Fees from Government Departments other than Ministry of Health totalled LS. 2,212,955 m/ms. compared with LS. 2,413.625 m/ms. for last year. It is planned

at the fees be revised towards the end of next year to allow for the progressive re ase in cost of chemicals, apparatus, books and other services.

2. Water and Sewages

Samples of Water and Sewages were received from the following sources :—

	1960/61	1959/60
Ministry of Health	122	136
Drilling Engineer	232	146
Sudan Gezira Board	48	5
Other Sources	74	116
TOTAL	476	403

The increase this year is mainly from the Drilling Engineer Department. Samples from industrial sources has decreased.

(a) *Bore-holes and Well Waters*

The following table gives details of the unusual waters received from the above sources during the year.

Sample No. F.	Source	Province	Remarks	P.P.M.
50	Well, Suakin	Kassala	Nitrates as N	100—120
87	Bore No. 1113, Um Direina	Kordofan	Nitrates as N	100
232/4	Well, Musmar	Kassala	Total Solids	7,200—12,200
			Nitrates as N	160—750
423	Bore No. 1140, Rahad	Kordofan	Nitrates as N	100—125
336	Well No. 5, Suakin	Kassala	Sulphates as SO_4 ...	1,050
795	Well, Khartoum	Khartoum	Total Hardness as $CaCo_3$	48
			Total Alkalinity as $CaCo_3$	840
930	Well, Sinkat	Kassala	Sulphates as SO_4 ...	1,050—1,150
1409	Well, Sennar	Blue Nile	Total Hardness as $CaCo_3$	100
			Total Alkalinty as $CaCo_3$	480
1490	Bore No. 1170, Renk	Upper Nile	Total Solids	9,300
			Sulphates as SO_4 ...	3,700
1518	Well, Wad Kheir	Blue Nile	Total Solids	21,700
			Chlorides as Cl	8,200
			Sulphates as SO_4 ...	5,100
1519	Well, El Konouz	Blue Nile	Excess Alkalinity as NaCo 2 3	1,080
			Fluorides as F	5.6
1524	Bore No. 1166, Hamart El Wiz	Kordofan	Flourides as F ...	4.2—5.4
1858	Salty Well (1) Gaa'	Kordofan	Total Solids	82,780
			Chlorides as Cl	22,900
			Sulphates as SO_4 ...	29,750
1859	Salty Well (2) Gaa'	Kordofan	Total Solids	140,800
			Chlorides as Cl	48,800
			Sulphates as SO_4 ...	39,850
1930	Bore No. 1028, Sinkat	Kassala	Total Solids	6,800
			Sulphates as SO_4 ...	1,680
2001	Bore No. 970, Loota	Blue Nile	Sulphates a SO_4 ...	1,010
2150	Bore No. 1196, Faragin	Blue Nile	Sulphates as SO_4 ...	1,295
1897	Hot Spring, Um Brimbeta	Kordofan	Flourides as F	15.0

Sample No. F.	Source	Province	Remarks	P.P.M.
1898	Saraf, El Sahal	Kordofan	Fluorides as F	6.8
2470	Well, Sinkat Hospital	Kassala	Total Solids	30,500
			Total Hardness as $CaCo_3$	17,800
2723	Bore No. 1120, Gedaref	Kassala	Total Alkalinity as $CaCo_3$	2,630
			Excess Alkalinity as $NaCo_3$	1,910
			Fluorides as F	5.2
3516	Well, Rahad	Kordofan	Nitrates as N	100
3610	Well, Wad Onsa	Blue Nile	Total Alkalinity as $CaCo_3$	500
			Excess Alkalinity as $NaCo_3$	415
3672	Open Well, Malaaba	Blue Nile	Total Solids	14,400
			Total Hardness as $CaCo_3$	5,250
3669	Bore No. 1214, Fadagouba	Blue Nile	Total Solids	6,900
			Total Hardness as $CaCo_3$	4,000

Nitrates remain to be the main problem in deep borehole water. High sulphates are also prominent in the Red Sea Hills area while high alkalinity is still the main feature of water from Gedaref area.

There are two extraordinary reports worth mentioning here. One is in connection with sample No. F/1409 which was drawn from a well at Sennar (see above). The Public Health Officer of the area reported that people kept complaining that the water after ingestion often gave rise to colic and buring urination. The other report was on sample No. F/3610 from a well from a village near Sennar (see above). The Medical Officer at Sennar Hospital reported that several villagers have complained that on drinking the water they usually get bloody urine (hamaturia). The possibility of bilharziasis was excluded.

From the above two cases and the earlier case reported in my Annual Report of 1958/59, there is an obvious indication that water containing an excess sodium bicarbonate alkalinity over 400 p.p.m. as Na_2Co_3 at a pH as low as 8.3 tends to cause renal trouble. According to the standards laid down by the American Public Health Association up to 400 mg/litre of Total Alkalinity as $CaCo_3$ is allowed at a pH of 8.0 to 9.0. It seems that even this concentration could give rise to renal troubles in the Sudan. The possible reason is that the intake of water in this country per person per day is about three times that in temperate countries.

Anyway, it is hoped that the public health and medical authorities at Gedaref area could complete their clinical investigation on the frequency of renal ailments in the area.

No samples of sewage or effluent were received during the year. This is mainly due to the operation of the small control laboratory in the sewage works at Khartoum which has taken over the control work we used to do. Nevertheless it is expected that on the operation of the scheme samples will be presented by the Public Health Authorities.

(b) *Khartoum Mains and River Waters*

The normal routine of monthly water analysis of mains and river waters at Khartoum has continued. Results of analysis of White Nile, Blue Nile and Mains supply waters at Khartoum during the year are shown in the appendix at the end of this Report. Reprints of these have been in continuous demand by Government Departments and industrial concerns.

3. Foods

The following samples were received during the year :

	1960/61	1959/60
Official Samples	266	325
Other Samples	203	71
	469	396

There is a marked decrease in official samples. This is a very unfortunate trend as while the tendency towards selling noxious and adulterated foods is rapidly increasing, there is no tendancy to take legal steps to stamp out the trouble. The main reason is that the law does not permit cases to be dealt with quickly and distinctly in the absence of food standards or special food regulations. On the other hand there is no official body responsible for the supervision of the market, the taking of samples and the taking of legal action against offenders. The superintendent of standards in the Ministry of Commerce, Industry and Supply was not given this responsibility. Public Health Authorities confine themselves to actions with respect to noxious foods. The rest is left to the public. In my opinion, it is time that a certain body takes full responsibility of supervising the quality of food sold to the public.

The following table gives a summary of the different types of foods ex mined.

Alcoholic drinks	143
Beans	
Cereals and cereal products	55
Cheese	2
Dates	
Fruits, canned	3
Honey and syrups	3
Meat and meat products	6
Milk, raw	85
Milk, dried	2
Salt, common	10
Sardines	4
Squashes	12
Sugar, refined	15
Sugar beet roots	9
Sugar cane	5
Tomato puree and sauce	5
Rice	12
Others	84
TOTAL ..	469

Milk

With raw milk the problem of adulteration with added water is still prominent. The Ministry of Animal Resources has not yet operated its pasteurisation and bottling plant which is expected to solve the problem in the Three Towns.

With dried milk the main trouble is developed milk fat acidity and rancidity and solubility of old stocks of dried whole milk powders.

Alcoholic drinks

Locally manufactured wines still give a great deal of trouble to public health authorities. The dilution of matured sherries with water just before bottling leads to precipitation of various organic salts in the bottles. On the other hand unhygienic conditions during bottling in the provinces lead to the inclusion of many foreign objects in the bottles e.g. insects, dust, plant debris, etc. In spite of our report on these industries and their deficiencies in our last Report no improvement was noted during the year.

Tinned Foods

Practically all samples were condemned on obvious blowing or leaking or heavy corrosion and metallic contamination. The improvement in quality noted last year over the year before was also maintained during this year.

Squashes

All samples presented were offered for sale as fruit squashes. None of these contained any genuine fruit juice or pulp. Practically all squashes sold in the market are artificially coloured and flavoured drinks.

Some of those also show mould growth, and in many cases these are prepared without any preservative.

Cereals and Cereal Products

Most of these were samples of wheat flour, dura grain and flour. As usual the majority of samples were sent in respect of heavy pest infestation or developed acidity in old stocks.

Comments

The need for some food standards legislation remains to be of extreme importance and urgency. The continued sale of food articles of extremely low standard of quality, contaminated or adulterated folds have become a common practice to the extent that it is being regarded by the seller and the public as an accepted practice. As mentioned before there is no special body responsible for quality supervision, and cases taken up by private individuals tend to discourage others because of the lack of legislation regarding quality standards of food.

4. Drugs and Pharmaceuticals

There is a substantial increase in the number of samples in this category. The difference is practically confined to samples presented by the first pharmaceutical factory of Sudanese Chemical Industries which started the routine production of drugs and pharmaceuticals during the year. The work done for the company was mainly quality control work on some raw materials and finished products.

The other samples were presented mainly by the medical stores or the controller of pharmaceutics ; other samples were presented by the police, being found with some people unlegally practicing medicine.

Most of the samples presented by the controller of pharmaceutics were found to be unfit for medical use. These were collected from various pharmacies and

drug stores. They included syrups, tablets, injections, eye drops, various vitamin preparations etc. which had deteriorated.

The Pharmaceutical Control section which was approved last year has not yet commenced its activities. The construction work in the section has not been started.

On the other hand the Drug Control Sub-Committee of the Central Board of Public Health continued its meetings for the final amendment of the existing Pharmacy and Poisons Laws. New suggestions and comments of its draft were thoroughly studied and the whole law was redrafted by the sub-committee and brought up to date. It is hoped that within the next year the new Act will come into force enabling the health authorities to control a rapidly expanding trade.

5. Clinical Specimens

Clinical work is increasing enormously each year to the extent that a special section may become necessary in the near future. The following table shows this increase since 1957.

Year	No of samples
1957/58	8
1958/59	48
1959/60	89
1960/61	142

It is also expected that during the next year, 1961/62, the number of samples will be doubled.

The clinical work done in the labrotaries is confined to the work that could not be done in Stack Laboratories. This includes split and unsplit fats in stools, uric acid in blood and serum, calcium, phosphorus and chlorides in blood, nature of bile and renal stones and others. It is worth mentioning that some clinical work is also being done for private practitioners.

6. Toxicological Specimens

These include specimens in connection with medico-legal cases tested in connection with poisoning cases to humans and animals. Food poisoning cases dealt with through the public health authorities are not dealt with here and come under the foods section.

A. Human Poisoning

The following were among the cases submitted.

(i) A man, after taking a native medicine to cure constipation, was taken to Wau Hospital with severe poisoning symptoms and died there. The native medicine was identified as being a decoction of the plant Courbonia Virgata. Post mortom specimens were found to contain its toxic principle, tetramine.

(ii) A morphine addict after taking illegally an unknown injection was brought to Wad Medani Hospital with severe poisoning symptoms. The injection was identified as atropine sulphate.

(iii) A native drink that caused severe poisoning to a number of people in Sennar was identified as a decoction of powdered Datura seeds.

A similar case from Sennar of a powder added to the food of some people and caused their poisoning was identified as powdered Datura seeds.

A third case from Sennar also of a plant powder added to tea and food of some people caused severe poisoning and the death of one of them. The plant powder was also identified as powdered Datura seeds.

(iv) A native medicine made of a powdered root was given to an epileptic child at Tonj and caused his death. The root contained an unidentified glycoside. A decoction of the roots was given orally to a monkey and caused its death within ten minutes.

(v) A child ingested seeds of a plant in a public garden and showed severe symptoms of poisoning. The seeds were identified as those of Jatropha Multifida which contains a toxa-albumin. The plant was consequently removed from all public gardens all over the country.

(vi) Many cases of alcohol intoxication were examined, mostly in urine samples. One abnormal case in which the blood of the deceased showed an alcohol concentration of 1180 mg. per 100 ml. of blood.

(vii) Native medicine made of leaves caused poisoning to some people at Wau. The leaves were identified as those of "Senna".

(viii) A powdered plant material was sent by Police at Fasher in connection with a murder case. The powder was found to be that of the corm of Gloriosa Virescens containing the alkaloid colchicine.

(ix) A mixture of plant powders given to a young boy as a native medicine caused severe poisoning symtoms. The powder was found to contain anthraguinones and saponins.

(x) A sample of root sent from Wau hospital in connection with a poisoning case was identified as roots of Courbonia Virgata.

(xi) An injection that caused death to a woman was identified as that of an iron preparation.

(xii) A powder used by a person to cure eye disease was found to be a powdered stone containing ferric and chromic oxides.

B. *Animal Poisoning*

(i) Post mortem specimens of dead chickens from Shambat showed the presence of cyanides.

(ii) Post mortem specimens of a cow from Shambat showed the presence of zinc phosphide. Rat bait was discovered in its pasture.

(iii) Post mortem specimens of goats from Upper Nile showed presence of cyanides. The grass they fed on also showed cyanogenetic glycosides.

7. Other Forensic Specimens

These are specimens sent by the police other than poisoning cases. Some of these are the following :

(i) An enormous number of specimens of native Hashish "Bango" was examined during the year. A piece suspected as that of opium was identified as imported Hashish. Also a number of plants were identified as Hashish plant.

(ii) A considerable amount of perfumes were sent by the police frequently. In all cases these were adulterated with water and bottled in bottles of known brands of perfumes. Apart from articles of food, perfumes seem to be the next field of wide spread adulteration.

(iii) Three sheets of paper, two containing typed script, were all found to be of the same material.

(iv) In a case of fire a white lump was presented for examination. This was identified as sodium thiosulphate.

(v) A trace of paint on a Gallabia dress, a paint tin, and scrapings were chemically, physically and spectrographically found to be identical.

(vi) In a case of fire in a cinema studio at Khartoum a burnt roll of film was examined for nitrocellulose for the police. No nitrocellulose was detected.

Comments

In all toxicological specimens this year and the years before the most noticeable feature is the number of Datura poisoning cases from Sennar district. In some of the cases the powdered Datura seeds are often added to tea or drinks and taken. In most cases thieves added the powder to drinks or food of travellers in order to steal their belongings. The three cases reported this year were all of deliberate drugging of people. It is very interesting that these cases are confined only to Sennar Area.

Another point is the mode of sending biological materials and post mortem specimens for toxicological analysis. We still get very small specimens with little or no comment at all. A special Laboratory form is being prepared to be filled in by the police and the doctors in such cases.

As the forensic cases are getting more in number and the police is intensifying their need to scientific investigation of crimes it is being planned to expand the Forensic and Toxicology section in these laboratories to cope with the increase in work.

8. Edible Oils, Seeds and Oil Cakes

The following samples were submitted for analysis during the year :

	No. of Samples	
	1960/61	1959/60
Cotton Seeds	131	89
Groundnuts	1,532	1,569
Sesame Seeds	23	77
Safflower	1	4
Caster Seeds	3	—
Edible Oils	69	49
Oil Cakes	122	38
Colza Seeds	—	1
Rape Seeds	—	1
	1,881	1,828

There is a slight increase in these samples over the previous year mainly on Cakes.

Damaged Materials

Damaged materials submitted for examination in connection with insurance ms totalled 245 compared with 376 samples last year. Damage is usually done goods in transit by sea water, rain, mineral oils, fire or contamination with other terials shipped with it.

Miscellaneous Samples

The following table shows the various types and samples examined in this egory :

	No. of Samples
Cigarettes	8
Fertilisers	7
Gums	19
Minerals	40
Paints, Varnishes and Polishes	23
Pesticides	37
Soaps	40
Textiles	17
Miscellaneous	23
	219

This category usually shows a wide variety of materials. In most cases samples presented to see whether they comply with certain specifications, especially with ard to Government purchases.

RESEARCH REPORT

As mentioned in previous reports no long term research is planned and none xpected for some time to come. The continuous increase in routine samples and lack of trained personnel give no time for serious research. Nevertheless, pro-ms that crop up during the routine are usually investigated briefly and kept in records for future reference and more research wherever the time allows.

1. Composition of the Nile's Waters at Khartoum.

Regular monthly analysis of Khartoum rivers and mains waters is continued a routine. The data compiled over the years will be useful later in assessing long term trend in the change of the composition of these waters and the influence various factors in these changes.

2. The Effect of Various Chemical Constituents in Drinking Water.

Research in this line was confined to the effect of nitrates on human and mal health. Now another constituent in the soduim bicarbonate alkalinity ich during the last three years proved to have ill effects on human health. Clinical orts from Gedaref area where alkaline waters are prominent are being compiled. anwhile a maximum limit for excess alkalinity of 400 p.p.m. as $Na_2 Co_3$ is being pted.

3. Folk Medicine.

We receive various reports each year of vegetable materials having some medicinal properties. Very little is usually done in the way of research on such materials as chemical investigations to establish the alleged medicinal value are never complete or convincing. However, in few cases, some work is being done. The plant Ocicum Basilicum, for example is being investigated for its alleged properties in the treatment of jaundice, and its insecticidal properties.

REPORTS AND PUBLICATIONS

The following publications were published during the year.

1. Annual Reports of the Government Analyst with the following Appendices

(a) Composition of monthly water samples taken from Khartoum Main Supply Blue Nile and White Nile.

(b) Sudan Folk Medicines and Materia Medica, Part 2 "Catalogue of Minera Samples with Notes on Uses."

2. "Examination of Pharmaceutical Preparations in The Sudan" by A. H. Ibrahim. Published by W.H.O. pamphlet No. WHO/Pharm/Exa/30 24. August, 1960.

It should be noted that in recent years the number of publications have become rather small. This is because of the restriction imposed on all types of research in favour of the heavy routine work which is all of a very urgent nature. This is expected to continue till the staff position is improved.

Appendix I

COMPOSITION

of

MONTHLY WATER SAMPLES

taken from

KHARTOUM MAINS SUPPLY

BLUE NILE

WHITE NILE

WELLCOME CHEMICAL LABORATORIES

TABLE I. COMPOSITION OF KHARTOUM MAINS SUPPLY

(Blue Nile Water Treated with Alum, Filtered and Treated by Marginal Chlorination)

Date	2.7.60	2.8.60	1.9.60	2.10.60	2.11.60	3.12.60	2.1.61	2.2.61	2.3.61	3.4.61	2.5.61	4.6.61	3.7.61
pH	8.3	8.1	8.2	8.2	8.1	8.1	8.1	8.3	8.2	8.1	8.2	8.2	8.2
Total Dissolved Solids p.p.m. ...	160	228	140	104	80	100	132	100	130	130	130	176	120
Total Hardness p.p.m. ($CaCo_3$) ...	106	180	124	78	76	80	88	86	106	110	114	104	106
Total Alkalinity ($CaCo_3$) p.p.m.	80	100	70	80	70	80	90	70	110	110	120	100	70
Calcium (Ca) p.p.m.	28	54	38	11	20	22	23	21	25	24	29	28	27
Magnesium Mg) p.p.m.	9	11	7	12	6	6	7	8	9	12	10	8	9
Silicate (SiO_2) p.p.m	10	10	12	8	18	18	14	10	10	10	8	12	8
Sulphate (So_4) p.p.m.	19	77	48	24	10	14	38	19	34	19	14	29	24
Chloride (CL) p.p.m.	6	4	4	4	1	4	4	3	4	6	8	8	4
Nitrate (N) p.p.m.	0.8	1.8	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Ammoniacal Nitrogen (N) p.p.m.	0.06	0.04	0.02	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	0.02
Albuminoid Nitrogen (N) p.p.m.	0.10	0.06	0.04	NIL	0.04	NIL	0.16	0.08	NIL	NIL	0.3	0.06	0.10

TABLE COMPOSITION OF WHITE NILE WATER AT KHARTOUM

Date	2.7.60	2.8.60	1.9.60	2.10.60	2.11.60	3.12.60	2.1.61	2.2.61	2.3.61	3.4.61	2.5.61	4.6.61	3.7.61
Water Temperature C	27	27	33	31	26	22	21	18	17	23	24	29	27
pH	8.3	8.2	8.2	8.2	8.6	8.8	8.2	8.7	8.2	8.3	8.4	8.3	8.4
Total Dissolved Solids p.p.m.	140	120	120	112	72	88	100	70	110	122	138	190	120
Total Hardness ($CaCo_3$) p.p.m.	54	90	60	54	46	54	50	48	52	110	110	66	66
Total Alkalinity ($CaCo_3$) p.p.m.	90	100	100	90	80	80	80	90	100	120	140	130	120
Calcium (Ca) p.p.m.	12	21	12	24	10	9	10	10	10	26	11	10	8
Magnesium(Mg) p.p.m.	6	9	7	Nil	9	8	6	6	2	11	20	10	11
Silicate (SiO_2) p.m.p.	10	10	10	6	4	4	12	20	10	8	6	16	10
Sulphate (So_4) p.p.m.	14	10	10	14	14	14	19	19	14	19	14	29	16
Chloride (Cl) p.p.m.	10	4	8	4	6	4	4	4	6	10	12	14	12
Nitrate (N) p.p.m.	0.8	1.6	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Ammoniacal Nitrogen (N) p.p.m.	0.06	0.06	0.04	Nil	0.04	Nil	0.04	0.04	0.24	Nil	Nil	Nil	0.04
Albuminoid Nitrogen (N) p.p.m.	0.20	0.14	0.16	0.16	0.4	Nil	0.4	0.26	0.5	0.10	0.5	0.24	0.3
Dissolved Oxygen p.p.m.	6.4	6.4	5.4	7.1	7.1	8.0	7.9	8.25	8.25	7.4	6.7	3.2	3.7
Biochemical Oxygen Demand p.p.m.	1.6	2.9	2.7	4.6	4.7	5.2	5.6	4.83	4.3	4.6	2.7	1.5	2.4

TABLE COMPOSITION OF BLUE NILE WATER AT KHARTOUM

Date	2.7.60	2.8.60	1.9.60	2.10.60	2.11.60	3.12.60	2.1.61	2.2.61	2.3.61	3.4.61	2.5.61	4.6.61	3.7.61
Water Temperature °C	27	27	27	28	26	23	22	20	18	24	24	29	28
pH	8.3	8.2	8.2	8.3	8.2	8.4	8.7	8.8	8.3	8.3	8.4	8.5	8.3
Total Dissolved Solids p.p.m.	120	120	112	104	80	96	112	96	120	132	116	140	100
Total Hardness p.p.m. ($CaCo_3$)	88	86	78	62	70	74	80	66	98	106	112	104	86
Total Alkalinity p.p.m. ($CaCo_3$	90	100	90	70	80	90	90	90	110	120	120	110	90
Calcium (Ca) p.p.m.	24	26	22	19	18	19	21	19	23	36	29	42	23
Magnesium (Mg) p.p.m.	7	5	5	3	6	6	7	4	10	10	9	Nil	7
Silicate (SiO_2) p.p.m.	15	10	10	8	20	20	16	12	10	12	8	14	10
Sulphate (So_4) p.p.m.	10	10	10	10	10	10	29	19	19	19	14	19	10
Chloride (Cl) p.p.m.	6	2	4	10	4	4	4	2	4	7	8	10	4
Nitrate (N) p.p.m.	0.8	1.8	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Ammoniacal Nitrogen (N) p.p.m.	0.08	0.02	0.04	Nil	Nil	0.06	0.12	0.10	Nil	Nil	Nil	Nil	0.02
Albumincid Nitrogen (N) p.p.m.	0.34	0.04	0.06	Nil	Nil	0.2	0.6	0.36	0.04	Nil	Nil	0.2	0.04
Dissolved Oxygen p.p.m.	6.3	5.5	4.4	6.0	6.8	7.6	9.2	7.97	8.1	8.9	7.5	3.2	3.4
Biochemical Oxygen Demand ...	0.7	2.5	0.9	2.0	1.4	1.6	7.2	6.13	2.6	3.2	1.6	3.1	1.5

SCHOOL OF HYGIENE

The School buildings lie next doors to the Graphic Health Museum which is supervised by the Principal, School of Hygiene.

The museum is used by the students for demonstration and visual studies.

Staff

Principal
Asst. Principal
Public Health Officer
Clerk

Board of Studies

The Board of Studies which consists of the A/Director (Public Health) as Chairman. Principal. School of Hygiene as Secretary, Chief Public Health Inspector and Asst. Principal. School of Hygiene as members has held four meetings during the year to discuss the different aspects of the School policy.

Board of Examiners

The R.S.H. examination which is held in Khartoum, is conducted by Dr. Abdalla Omer Abu Shamma, Dr. Mansour Ali Haseeb, Sayed Abdel Rahman El Agib and Sayed Khalafalla Babiker with the Principal, School of Hygiene in attendance.

Sanitary Overseers

On selection and when required the candidates receive a six months' training in the School of Hygiene, which includes an adequate number of demonstrations to supplement lectures. No training has been conducted during the year.

Public Health Officers

The basic education now required is that of the secondary standard.

The students take a 3 years course at the end of which they must pass the R.S.H. examination before being awarded the qualifying certificate.

20 students were taken in 1960/61

The Curriculum is Briefly as Follows :

1st Year :

General Science, Building Science, Drawing and Construction, Levelling and Geometry, given at Khartoum Technical Institute.

2nd Year :

Entomology and Pest Control. Helminthology. Protozoology. Bacteriology. Water Supply and Disposal of Waste Matter.

3rd Year :

Food and Food Control. Meat Inspection. Milk Food Production and Manufacture. Housing, Urban and Rural Planning. Communicable Diseases. School Health. Prison Health. Quarantines. Airports and Seaports. Central Statistics, Sanitary

Law, Relations Between Councils and Public Health Staff, Notes on training within industries, Health Education.

The necessary demonstrations that supplement the lectures include visits to Water Works, Food Production Places, Schools, Prisons, and Factories, etc. Certain council meetings are also attended. In addition to the demonstrations and practical training in Khartoum Province and its rural areas, each student spends part of his school vacation in another province besides Khartoum.

The School of Hygiene gives courses to Assistant Sanitary Overseers, Local Government Executive Officers, Health Visitors, Nurses and Medical Assistants when required.

CHAPTER XI

THE GRAPHIC MUSEUM

No change of staff has taken place during the year.

Revision, keeping up to date and translation of exhibited material, together with the routine maintenance was carried out satisfactorily. An extensive programme of work on outside exhibitions during tribal gatherings and agricultural shows was carried out. Photographs were given to Doctors preparing for D.P.H.

18,320 persons visited the museum during the course of the year, among whom were distinguished persons from foreign countries. The Senior Class of Medical Students, Students of the School of Hygiene, Medical Assistants, Health Visitors, Midwives and junior hospital staff, pupils of secondary schools and elementary schools, both boys and girls, etc., continue to visit the Graphic Museum for educational purposes.

Permanent Exhibitions

The following material was added during the year :—

Photographs	140
Charts and Graphs	12
Drawings	3
Descriptive Notes	190
Models	—
Specimens	—
Posters	2

The Exhibition now comprises :—

Photographs	2,621
Charts and Graphs	254
Drawings	299
Posters	19
Descriptive Notes	2,498
Specimens	676
Models	200

Sections of the museum are :—

1. Malaria
2. Trypanosomiasis
3. Leishmaniasis
4. Syphilis
5. Yaws
6. Relapsing Fever
7. Filariasis
8. Diphtheria
9. Ancylostomiasis
10. Schistosomiasis
11. Madura Disease
12. Nutrition
13. Gonorrhoea
14. Cholera
15. Tetanus
16. Tuberculosis
17. Anthrax
18. Cerebro-Spinal-Meningitis
19. Plague
20. Rabies
21. Leprosy
22. Measles
23. Mumps
24. Yellow Fever
25. Smallpox
26. Vaccinia
27. Chicken-pox
28. Dengue
29. Typhus
30. Quarantine Arrangements
31. Phlebotomus Fever
32. Disinfection Methods
33. Meteorology
34. Water Supply
35. Influenza
36. Pneumonia
37. Dysentery
38. Enteric Fever
39. Maternity and Child Welfare
40. School Medical Service
41. Town Planning
42. Housing
43. Undulant Fever
44. Eye Diseases
45. Medical Entomology
46. Skin Diseases
47. Disposal of Waste Matter
48. Folk Medicine
49. Propaganda
50. Rural Health
51. Hydatid Disease
52. Venomous Snakes
53. Historical Medicine
54. Tumours

The Museum is contributing in making local films on health education.

CHAPTER XII

METEOROLOGY

The following table shows the mean rainfall recorded in provincial meteorological stations :

Province	No. of Stations	Mean Rain-Fall mms	Highest recorded mms	Lowest Recorded mms
Bahr El Ghazal	10	1.021	1.542	461
Blue Nile	22	353	951	57
Darfur	10	548	723	268
Equatoria	16	1.248	1.980	785
Kassala	15	224	605	29
Khartoum	6	79	162	50
Kordofan	10	515	890	269
Northern	9	14	37	trace
Upper Nile	9	806	1.326	320

TABLE I—1960/61

OUT-PATIENTS

NEW CASES BY DISEASE AND TOTAL ATTENDANCES

No.	Disease Name	B. el Ghazal	Blue Nile	Darfur	Equatoria	Kassala	Khartoum	Kordofan	Northern	Upper Nile	Total	No.
1	Cholera ...	—	—	—	—	—	—	—	—	—	—	1
2	Plague	—	—	—	—	—	—	—	—	—	—	2
3	Smallpox ...	—	146	1	—	—	3	—	12	—	162	3
4	Typhus ...	—	—	—	—	—	—	—	—	—	—	4
5	Yellow Fever ...	—	—	—	—	—	—	—	—	—	—	5
6	T.B. Pulmnary	567	1,462	277	351	1,125	1,515	661	733	1,173	7,864	6
7	T.B. Non-Pulmonary ...	298	1,310	104	153	1,052	706	518	804	1,372	6,317	7
8	Pneumonia ...	2,971	25,602	5,202	9,822	5,321	14,083	14,276	17,497	9,018	103,792	8
9	Influenza ...	889	2,749	1,734	16,569	2,217	21,992	4,380	20,448	1,047	72,025	9
10	Other Respiratory Diseases ...	40,421	859,983	162,756	210,508	236,877	340,148	300,702	291,585	93,209	2,536,189	10
11	Cerebro-Spinal Meningitis ...	199	1,030	2,325	190	81	2,981	669	236	126	7,837	11
12	Chicken Pox ...	1,466	3,476	680	3,664	1,669	7,568	894	2,084	3,074	24,575	12
13	Diphtheria ...	2	109	—	10	101	316	44	103	6	691	13
14	Encephalitis Lethargica	—	—	—	4	—	8	1	—	—	13	14
15	Measles ...	481	5,293	362	3,833	2,794	3,911	5,212	6,744	2,617	31,247	15
16	Mumps	294	8,283	1,757	1,192	2,542	7,576	4,287	4,417	1,411	31,759	16
17	Poliomyelitis Acute ...	—	28	—	3	21	33	27	5	2	119	17
18	Rheumatism. Acute ...	8,442	4,856	3,419	2,653	945	10,242	4,745	8,447	6,101	49,850	18
19	Whooping Cough	30	2,548	59	4,292	2,606	5,268	3,106	3,832	983	22,724	19
20	Dysentery ...	5,122	45,842	21,778	15,078	8,913	56,858	22,919	46,422	20,176	243,108	20
21	Enteric Fever ...	1	290	—	9	33	155	6	74	10	578	21
22	Gastro-Enteritis of Children ...	901	68,721	4,503	3,664	5,083	27,961	22,506	33,497	11,907	178,743	22
23	Undulant Fever	—	3	—	3	1	1	2	4	—	16	23
24	Filariasis ...	37	51	—	1,818	—	3	12	—	15	1,936	24
25	Leishmaniasis	—	1,856	50	143	718	143	157	5	2,005	5,077	25
26	Malaria ...	31,592	77,620	67,198	165,966	57,074	17,631	160,998	14,850	52,472	645,311	26
27	Blackwater Fever	—	—	—	1	—	1	1	—	—	3	27
28	Onchocerciasis...	1,428	1	11	1,176	—	4	—	—	—	2,620	28
29	Phlebotomus Fever ...	—	—	—	—	—	3	—	—	—	3	29
30	Relapsing Fever	—	—	—	—	22	—	—	—	—	22	30
31	Trypanosomiasis	—	—	—	280	—	—	—	—	—	280	31
32	Ancylostomiasis	2,391	177	174	9,774	14	24	44	36	230	12,864	32
33	Dracontiasis ...	1,587	84	3	1,221	181	210	522	—	228	4,036	33
34	Schistosomiasis	956	17,910	6,036	5,355	513	6,437	10,090	5,421	159	52,877	34
35	Gonorrhoea ...	5,350	8,516	17,680	14,410	6,566	20,858	14,140	3,733	11,049	102,302	35
36	Soft Sore ...	46	211	651	119	315	321	577	—	105	2,345	36
37	Syphilis ...	8,409	8,347	40,099	13,038	7,863	14,606	28,846	5,281	23,065	148,554	37
38	Yaws	6,599	19	—	18,921	—	1	4	—	13,396	38,940	38
39	Anthrax ...	2	9	5	2	233	8	5	—	9	273	39
40	Hydrophobia Human ...	1	2	—	1	—	3	2	—	2	11	40
41	Leprosy ...	796	162	5	673	7	84	138	47	83	1,995	41
42	Madura Disease	3	677	15	—	30	2,338	76	215	1	3,355	42
43	Tetanus ...	29	98	4	32	10	23	25	12	71	304	43
44	Heat Stroke Syndrome ...	—	—	2	—	8	—	5	—	—	15	44
45	Confinements ...	294	2,073	294	950	614	3,752	729	420	370	9,496	45
46	Gynaecological	1,570	26,667	10,205	3,312	6,803	17,532	16,976	11,509	1,265	95,839	46
47	Diseases of Pregnancy and Parturition ...	661	8,322	196	2,384	555	9,983	12,290	2,850	77	37,318	47
48	Puerperal Fever	5	148	39	16	53	68	75	240	35	679	48
49	Wounds and Injuries ...	50,919	677,990	264,447	259,180	197,528	293,615	299,058	239,923	113,756	2,396,416	49
50	Tropical Ulcer	6,436	1,918	4,795	16,414	910	297	3,297	10	7,257	41,334	50
51	Diabetes ...	14	382	27	51	502	4,553	433	1,210	6	7,178	51
52	Pellagra ...	1	—	—	1	—	2	1	—	9	14	52
53	Scurvy ...	141	671	248	84	57	4	2,007	77	282	3,571	53
54	Neoplasma, Malignant ...	34	113	52	34	38	294	352	21	19	957	54
55	Neoplams, Non-Malignant ...	90	980	530	96	1,078	2,043	1,417	316	47	6,597	55
56	Trachoma ...	112	152,875	8,752	2,129	9,405	48,521	23,945	109,736	10,405	365,880	56
57	All Other Eye Diseases ...	16,321	608,844	107,456	88,448	177,741	303,846	150,180	259,045	74,183	1,786,064	57
58	Ear Diseases ...	8,402	123,995	28,657	24,202	46,086	82,118	48,359	54,125	19,475	435,019	58
59	Skin Diseases ...	15,117	73,925	28,668	58,600	20,478	62,719	73,233	26,306	22,008	381,054	59
60	Alimentary Diseases	38,442	1,000,191	223,961	190,246	246,470	330,022	404,088	349,140	75,453	2,858,013	60
61	Circulatory Disease. ...	320	110,163	70,778	1,859	17,805	40,558	32,191	48,018	3,215	324,907	61
62	Genito-Urinary Diseases ...	2,660	117,541	43,952	9,049	22,436	83,085	39,128	112,280	9,262	439,392	62
63	Organic Nervous Diseases ...	3	2,363	—	34	728	5,152	2,288	2,456	50	13,074	63
64	Functional Nervous Diseases	11	6,629	4,475	60	4	764	38	3,596	503	16,080	64
65	Fever of Uncertain Origin	27,003	33,285	34,698	28,384	20,079	113,203	12,912	36,807	71,155	377,526	65
66	All Other Conditions ...	51,452	577,276	343,552	176,683	118,743	261,261	233,445	123,787	85,436	1,971,635	
67	Poisoning ...	—	92	4	—	267		4	2,054	4	2,425	67
68	Hydatid Cyst ...	—			115	—			—	—	115	68
	Total New Cases	340,918	4,673,916	1,512,676	1,366,259	1,233,314	2,227,415	1,956,953	1,850,470	749,394	15,911,315	
	Mission Out-Patients Included Above:						4,235			50,124	54,359	
	Attendances											
	Men	386,340	2,400,687	926,556	1,006,863	780,018	1,479,675	1,170,885	941,507	504,604	9,597,135	
	Women ...	220,775	2,068,826	560,990	628,934	619,717	1,387,431	1,026,894	1,172,754	425,080	8,111,401	
	Children ...	310,928	3,374,441	844,491	818,440	946,776	1,631,008	1,549,147	2,170,068	579,088	12,224,387	
	Total Attendances	918,043	7,843,954	2,332,037	2,454,237	2,346,511	4,498,114	3,746,926	4,284,329	1,508,772	29,932,923	
	Mission Attendances Included Above						65,323			253,528	318,851	

TABLE 11—1960/1961

ADMISSIONS AND DEATHS BY DISEASE

No.	DISEASE NAME	BAHR EL GHAZAL		BLUE NILE		DARFUR		EQUATORIA		KASSALA		KHARTOUM		KORDOFAN		NORTHERN		UPPER NILE		TOTAL		No.
		Adm.	Deaths	Adm.	Deaths	Adm.	Deaths	Adm.	Deaths	Adm.	Deaths	Adm.	Deaths	Adm.	Deaths	Adm.	Deaths	Adm.	Deaths	Adm.	Deaths	
1	Cholera	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
2	Plague	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
3	Smallpox	—	—	135	—	1	—	—	—	—	—	3	—	—	—	12	—	—	—	151	—	3
4	Typhus	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4
5	Yellow Fever	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5
6	T.B. Pulmonary	273	27	837	45	143	6	289	16	588	30	1,080	82	470	87	398	9	414	35	4,402	337	6
7	T.B. Non-Pulmonary	86	5	370	11	17	—	64	3	187	3	246	8	145	5	78	2	117	3	1,310	40	7
8	Pneumonia	595	37	1,342	62	602	34	2,303	136	585	19	1,460	65	1,629	69	502	16	855	23	9,783	467	8
9	Influenza	34	1	24	—	34	—	513	32	50	1	280	—	677	—	853	2	19	—	2,484	36	9
10	Other Respiratory Diseases	285	15	1,490	22	466	10	607	12	923	21	1,458	34	1,804	47	980	9	338	16	8,351	186	10
11	Cerebro-spinal Meningitis	199	39	876	84	2,206	81	172	44	66	8	2,981	104	669	62	234	16	100	23	7,503	461	11
12	Chickenpox	626	2	314	—	286	1	618	3	261	—	64	—	494	—	80	—	284	—	3,027	6	12
13	Diphtheria	2	—	107	12	—	—	8	—	101	10	181	9	44	5	163	11	5	1	551	48	13
14	Encephalitis Lethargica	—	—	—	—	—	—	3	2	—	—	2	2	1	—	—	—	—	—	6	4	14
15	Measles	172	—	174	2	200	—	556	7	160	3	107	2	879	16	147	2	151	1	2,546	33	15
16	Mumps	59	—	307	—	173	—	67	1	22	—	17	—	205	—	60	—	61	—	971	1	16
17	Poliomyelitis, Acute	—	—	28	—	—	—	2	—	15	—	31	—	14	—	3	—	2	—	95	—	17
18	Rheumatism, Acute	166	2	210	1	104	—	82	—	74	—	164	2	282	2	136	—	154	—	1,373	7	18
19	Whooping Cough	1	—	110	1	39	—	148	8	19	—	57	1	59	2	128	3	35	—	596	15	19
20	Dysentery	168	6	656	12	412	12	561	39	328	8	622	12	474	15	303	3	1,170	74	4,694	181	20
21	Enteric Fever	1	1	225	6	—	—	9	—	32	—	155	6	6	—	74	1	10	—	512	14	21
22	Gastro-Enteritis of Children	40	—	1,911	152	6	1	275	30	432	23	1,207	111	337	25	672	64	271	18	5,151	424	22
23	Undulant Fever	—	—	3	—	—	—	3	—	1	—	1	—	2	—	4	—	—	—	14	—	23
24	Filariasis	7	1	1	—	—	—	35	—	—	—	3	—	6	—	—	—	3	—	55	—	24
25	Leishmaniasis	—	—	1,032	56	2	—	117	13	434	55	68	3	157	14	5	1	728	48	2,543	190	25
26	Malaria	823	35	2,026	25	591	16	2,594	107	1,547	17	289	3	2,760	79	126	4	1,190	50	11,407	336	26
27	Blackwater Fever	—	—	—	—	—	—	1	—	—	—	—	—	1	1	—	—	—	—	2	1	27
28	Onchocerciasis	56	1	1	—	—	—	12	—	—	—	4	—	—	—	—	—	—	—	73	1	28
29	Phlebotomus Fever	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	29
30	Relapsing Fever	—	—	—	—	—	—	—	—	19	—	—	—	—	—	—	—	—	—	19	—	30
31	Trypanosomiasis	—	—	—	—	—	—	280	—	—	—	—	—	—	—	—	—	—	—	280	—	31
32	Ancylostomiasis	269	2	3	—	—	—	592	12	3	1	19	—	3	—	15	—	32	2	945	17	32
33	Dracontiasis	64	—	4	—	—	—	97	—	15	—	119	—	51	—	—	—	7	—	357	—	33
34	Schistosomiasis	74	9	498	18	26	—	368	8	29	1	170	6	88	—	93	—	35	—	1,381	42	34
35	Gonorrhoea	84	1	34	—	103	—	356	1	20	—	10	—	164	—	6	—	83	1	860	3	35
36	Soft Sore	3	—	1	—	—	—	2	—	1	—	1	—	34	—	—	—	7	—	49	—	36
37	Syphilis	169	1	66	—	483	2	425	2	25	—	43	—	291	—	74	—	501	4	2,077	9	37
38	Yaws	77	2	1	—	—	506	—	—	—	—	—	—	—	—	—	—	193	—	778	1	38
39	Anthrax	—	—	9	—	5	—	1	—	62	3	8	—	5	—	—	—	9	—	99	3	39
40	Hydrophobia, Human	1	1	2	2	—	—	1	1	—	—	3	3	2	2	—	—	2	2	11	11	40
41	Leprosy	5	—	22	—	1	—	6	—	5	—	52	1	3	—	7	—	12	1	113	2	41
42	Madura Disease	—	—	190	—	4	1	—	—	25	—	163	—	20	—	19	—	1	—	422	1	42
43	Tetanus	29	7	90	28	4	1	25	7	10	4	23	3	25	10	12	2	71	21	289	83	43
44	Heat Stroke Syndrome	—	—	—	—	—	—	—	—	8	—	—	—	3	—	—	—	—	—	11	—	44
45	Confinements	262	7	1,486	15	277	6	883	6	612	9	886	6	729	10	282	3	232	8	5,649	70	45
46	Gynaecological	167	4	1,900	14	529	—	259	2	1,020	2	1,865	3	1,414	11	1,160	5	339	7	8,653	48	46
47	Diseases of Pregnancy and Parturition	78	1	1,985	7	165	3	324	1	355	3	1,481	3	251	2	373	1	77	3	5,989	24	47
48	Puerperal Fever	1	—	94	2	25	1	16	—	47	1	68	1	54	2	64	1	22	—	391	8	48
49	Wounds and Injuries	2,132	35	5,801	89	3,103	50	4,571	48	3,768	32	3,443	59	5,307	164	2,478	38	2,423	30	33,026	545	49
50	Tropical Ulcer	688	11	14	—	178	—	1,509	7	11	1	3	—	169	—	6	—	886	5	3,464	24	50
51	Diabetes	7	2	133	5	8	—	10	1	62	3	369	21	44	4	239	7	6	1	878	44	51
52	Pellagra	—	—	—	—	—	—	1	—	—	—	2	—	1	—	—	—	3	—	7	—	52
53	Scurvy	—	—	9	—	1	—	1	—	1	—	4	—	17	2	14	—	3	—	50	2	53
54	Neoplasms, Malignant	11	2	76	13	18	6	25	4	26	5	281	33	42	7	21	3	19	4	519	77	54
55	Neoplasms, Non-Malignant	17	—	146	1	125	—	70	—	53	—	381	17	52	—	41	—	47	3	932	21	55
56	Trachoma	1	—	6	—	12	—	20	—	41	—	6	—	14	—	59	—	101	—	260	—	56
57	All Other Eye Diseases	85	—	725	1	138	—	444	3	384	—	1,235	—	511	1	379	—	292	—	4,193	5	57
58	Ear Diseases	28	1	66	—	49	—	66	1	155	—	56	—	90	—	85	—	13	—	608	2	58
59	Skin Diseases	62	—	311	3	118	—	249	—	70	1	151	—	407	5	178	2	38	—	1,584	11	59
60	Alimentary Diseases	699	59	3,068	161	1,311	74	1,393	52	2,161	93	4,417	116	2,916	147	2,279	51	994	69	19,238	822	60
61	Circulatory Diseases	36	5	1,284	98	265	41	309	40	548	30	1,353	126	677	59	849	42	184	17	5,505	458	61
62	Genito-Urinary Diseases	49	2	1,067	30	484	20	154	3	382	9	1,252	54	624	24	753	9	127	9	4,892	160	62
63	Organic Nervous Diseases	3	—	137	8	—	—	20	—	150	6	224	23	106	5	220	4	12	—	872	46	63
64	Functional Nervous Diseases	11	—	84	3	41	3	25	—	4	—	26	1	20	—	60	—	34	5	395	12	64
65	Fever of Uncertain Origin	252	9	1,383	61	423	4	155	11	626	18	787	22	480	26	946	18	438	23	5,490	192	65
66	All other Conditions	2,919	168	2,075	36	1,084	34	2,139	47	1,259	23	1,801	56	1,227	34	651	12	666	23	13,811	433	66
67	Poisoning	—	—	58	7	4	1	—	—	33	2	—	—	4	—	56	3	—	—	155	13	67
68	Hydatid Cyst	—	—	—	—	—	—	90	6	—	—	—	—	—	—	—	—	—	—	90	6	68
	TOTAL	11,786	499	35,008	1,094	14,275	408	24,431	716	17,285	445	31,173	998	26,961	944	16,227	344	13,816	536	190,962	5,984	
	Missing in Patients Included Above	—	—	—	—	—	—	—	—	—	—	1,393	56	—	—	—	—	1,657	70	3,050	126	

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